ISSN 0253-4924

FOOD TECHNOLOGY Abstracts

Vol. 27 No. 10 October 1992

Central Food Technological Research Institute, Mysore
National Information System for Science and Technology
Department of Scientific and Industrial Research, New Delhi.

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FOOD TECHNOLOGY ABSTRACTS

Vol. 27 No. 10
October 1992

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Annual Subscription : Rs.250.00. US $ 85.00. Single Copy : Rs.25.00

CONTENTS

ABBREVIATIONS

A	ampere
AAS	atomic absorption Spectrometry
abstr.	abstract
ad lib.	ad libitum
ADP	adenosine diphosphate
Anon.	Anonymous
AOAC	Association of Official Analytical Chemists
approx.	approximately
atm	atmosphere
ATP	adenosine triphosphate
a_w	water activity
BHA	butylated hydroxyanisole
BHT	butylated hydroxytoluene
BOD	biological oxygen demand
b.p.	boiling point
Btu	British thermal unit
c-	centi- [as in cm, cm^2, cm^3]
cal	calorie
cd	candela
Ci	curie
CMC	carboxymethyl cellulose
COD	chemical oxygen demand
coeff.	coefficient
conc.	concentrated
concn.	concentration
cv.	cultivar
cwt	hundredweight
d-	deci-
DE	dextrose equivalent
detn.	determination
DFD	dark firm dry
diam.	diameter
dil.	dilute
DM	dry matter, Deutsche Mark
DNA	deoxyribonucleic acid(s)
dyn	dyne
E.	East, Eastern, etc
ECD.	electron capture detection
EDTA	ethylenediaminetetra acetic acid
Eh	oxidation-reduction potential
ELISA	enzyme-linked immunosorbent assay
f-	femto-[10^{-15}, as in fCi]
°F	degree Fahrenheit
FAO	Food and Agricultural Organization
FDA	Food and Drug Administration
FID	flame ionization detection
fl oz	fluid ounce
f.p.	freezing point
ft	foot, feet
g	gram
GC	gas chromatography
gn	gravity
gal	gallon
gf	gram-force
GLC	gas-liquid chromatography
h	hour
ha	hectare
HDPE	high density polyethylene
hl	hectolitre [100 l]
hp	horse power
HPLC	high performance/pressure liquid chromatography
HTST	high temperature short time
Hz	hertz [frequency cycle/s]
in	inch
IR	infrared
IU	international unit
J	joule
k-	kilo- [as in kcal, kg]
K	Kelvin
l	litre
lb	pound
lb	pound-force
LDPE	low density polyethylene
m-	milli- [as in mg, ml, mm]
m-equiv	milli-equivalent
m	molar concentration
M-	mega- [as in Mrad]
max.	maximum
min	minute [time]
min.	minimum
mol	mole
mol.wt	.molecular weight
m.p.	melting point
MPN	most probable number
MS	mass-spectrometry
n-	nano-[10^{-9}, as in nm]
N	Newton [$kg\ m/s^2$]
N.	North, Northern, normal concentration
NMR	nuclear magnetic resonance
NPU	net protein utilization
oz	ounce
p-	pico- [10^{-12}, as in pCi]
P	poise
P	probability
Pa	Pascal [N/m^2]
PAGE	polyacrylamide gel electrophoresis
PER	protein efficiency ratio
p.p.b.	parts per billion
p.p.m.	parts per million
PSE	pale soft exudative
PTFE	polytetrafluorethylene
PVC	polyvinyl chloride
PVDC	polyvinylidene chloride
qt	quart
R	rontgen
rad	rad or radian
ref.	reference(s)
rev/min	revolutions per minute
RH	relative humidity
RNA	ribonucleic acid(s)
S.	south, Southern, etc.
s.d.	standard deviation
SDS	sodium dedecylsulphate
s.e.	standard error
s	second [time]
SNF	solids-not-fat
sp.,spp.	species
sp.gr.	specific gravity
summ.	summary
Suppl.	Supplement
t	metric tonne
temp.	temperature
TLC	thin layer chromatography
TS	total solids
UHT	ultra-high temperature
UV	ultraviolet
V	volt
var.	variety
vol.	volume
v/v	volume/volume
w	watt
W.	West,Western,etc.
WHO	World Health Organization
w/v	weight/volume
wk	week
wt.	weight
yd	yard
yr	year
µ	micro-[as in g, m]
%:	per centum
>	greater than
≥	greater than or equal to; not less than
<	less than
≤	less than or equal to; not greater than

Chemical symbols are used for all elements.

ABBREVIATIONS FOR LANGUAGES

Language of text

Dutch	Nl
French	Fr
German	De
Italian	It
Japanese	Ja
Norwegian	No
spanish	Es
swedish	Sv

GENERAL

1956

Venkataraman (LV). **Food prospects in India by the turn of the century.** *Current Science* 63(1): 1992: 20-25

The present production status along with the per capita available and the requirement in 2000 A.D. of the following food items have been described: cereals and pulses; oilseeds; fruits and vegetables; plantation crops especially spices, and beverages; and meat and its products including poultry and fish. The food grains losses in the field and in storage are discussed and the future approach for safe and biodegradable pesticides are indicated. The future role of biotechnology in finding solution to the food problem is stressed. The manufacture of processed food in India is only 1.0% and it is strongly recommended to increase this level. KAR

1957

Gehlawat (JK). **Wealth from effluents of agro-based industries.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India* 1-15: 1991

Effluents should not be considered as waste materials but with suitable processing could be converted into useful materials. The paper covers aspects like general methods of processing effluents; recovery of constituents from effluent streams; methods of isolation, concn. and purification of components; physical, chemical and biochemical methods in conversions; effluents used for enhanced regeneration of raw materials; and the use of effluents in biotechnological process industries. GS

FOOD PROCESSING

Nil

FOOD PACKAGING

Packaging materials

1958

Kumar (KR) and Balasubrahmanyam (N). **Water vapour transmission rates of multi-layer flexible packaging materials.** *Journal of Food Science and Technology (India)* 29(4): 1992: 237-238

Water vapour transmission rate values of co-extruded films having different webs and laminates at conditions of 38 plus or minus 1 C with 90 plus or minus 2% rh and 27 plus or minus 1 C and 65 plus or minus 2% rh indicated a linear relationship between rh and WVTR for LDPE while hydrophilic polyamide containing composites indicated dependence on rh. The water vapour transmission rate of multi-layer films containing polyamide as the core layer ranged between 4.1 and 5.4 g/m^2.day at 38 plus or minus 1 C and 90 plus or minus 2% rh, while monofilms of polyolefins had values between 1.9 and 3.0 g/m^2.day. AS

FOOD ENGINEERING AND EQUIPMENT

1959

Azuara (E), Beristain (CI) and Garcia (HS). **Development of a mathematical model to predict kinetics of osmotic dehydration.** *Journal of Food Science and Technology (India)* 29(4): 1992: 239-242

A mathematical model based on mass balances to study the kinetics for osmotic dehydration was developed. The equation is useful for any geometrical configuration and was tested using published data on apple, beef and pineapple. In all cases of relatively short time exp., good predictions were obtained for long drying times until equilibrium was reached. AS

1960

Wang (J), Wolfe (RR) and Hayakawa (K-I). **Thermal process lethality variability in conduction-heated foods.** *Journal of Food Science* 56(5): 1991: 1424-1428

No single method is available to estimate the variability of thermal process lethality (W_{Fp}) as a function of all thermal process parameters which significantly influence W_{Fp}. Therefore, work was conducted to develop such a method. This was accomplished through screening and regression simulations/analyses. From 19 independent parameters, 12 significant ones were selected through the analysis. The selected parameters included means of slope index of heating curve (f_h), heating medium temp., and slope index of thermal death time curve (z), and the coeff. variations of f_h and z. A polynomial regression equation was developed for estimating W_{Fp} as a function of all parameters found significant through the regression simulation/analysis. The equation was validated experimentally. AS

1961

Tsukada (T), Sakai (N) and Hayakawa (K-I). **Computerized model for strain-stress analysis of food undergoing simultaneous heat and mass transfer.** *Journal of Food Science* 56(5): 1991: 1438-1445

A computerized method was developed for simulating transient state heat and moisture transfer and stress distribution in axisymmetric food undergoing drying process. For this development, a simultaneous heat and moisture transfer model was coupled with the virtual work principle applicable to a body undergoing volumetric changes. The developed method was verified by comparing experimental results with those predicted. Experimental results were obtained by drying cylindrically formed samples of hydrated starch granules. They included central temp., average concn. histories and photographically observed internal crack formations. AS

1962

Lee (JE) and Singh (RK). **Scraped surface heat exchanger orientation influence on particle residence time distributions.** *Journal of Food Science* 56(5): 1991: 1446-1447

Four levels of particle concn. for an "Interaction" exp. and three levels of carboxymethyl cellulose concn., flow rate, mutator speed and particle size were used for a "Tracer Only" exp. to determine particle residence times in horizontal and vertical scraped surface heat exchangers (SSHEs). Min. normalized particle residence time (NPRT) was not significantly affected by SSHE orientation in either type in the exp. However, max. NPRT was significantly higher with vertical SSHE except in the "Tracer Only" exp. Average particles travelled faster than average bulk fluid with less deviation in horizontal SSHE whereas mean particle velocity was less than average bulk fluid velocity and had greater deviation in vertical SSHE. AS

1963

Vyas (HK), Shah (CM) and Shah (US). **Different forms of corrosion in stainless steels and preventive measures.** *Indian Dairyman* 44(4): 1992: 193-202

In stainless steel, general corrosion and localised corrosion are commonly observed. The basic requirement for corrosion to take place in stainless steel material, the characteristics of general corrosion and its prevention are described. In localised corrosion, pitting, crevice corrosion, erosion corrosion, cavitation corrosion, intergranular corrosion, stress corrosion cracking are different types, the characteristics of each one is described along with the preventive measures. Galvanic corrosion, which happens between two dissimilar metals is also described and the preventive measures are listed. GS

ENERGY IN FOOD PROCESSING

Nil

FOOD CHEMISTRY AND ANALYSIS

Chemistry

1964

Gopala Krishna (AG). **Influence of water activity on autoxidation of methyl linoleate during storage.** *Journal of Food Science and Technology (India)* 29(4): 1992: 252-253

Peroxide and total carbonyl values showed no noticeable difference at 0.02 and 0.91 a_w. Anisidine value and polymer content were appreciably higher at a_w = 0.91. The results showed that the development of hydroperoxides and their subsequent secondary reactions were influenced to a considerable extent at high a_w. AS

1965

Mulvihill (DM), Rector (D) and Kinsella (JE). **Mercaptoethanol, N-ethylmaleimide, propylene glycol and urea effects on rheological properties of thermally induced β-lactoglobulin gels at alkaline pH.** *Journal of Food Science* 56(5): 1991: 1338-1341

1966

Graham (HD). **Isolation of gellan gum from foods by use of monovalent cations.** *Journal of Food Science* 56(5): 1991: 1342-1346

Gellan gum added to foods was recovered by precipitation with 2M NaCl. The precipitate was trapped on glass wool, washed with 1M salt sol. and eluted with boiling 40% H_2SO_4 or boiling 2 x 10^{-4}N NaOH. Elution with the dilute NaOH was as effective as use of 40% H_2SO_4, except with dog food, mayonnaise and salad dressing. The hydrocolloid content of the eluate was determined by the carbazole test. Recoveries from milk, beverages, salad dressing and other foods ranged from 75 - 94% (reproducibility 2-4%). The preferred cations for precipitation were $Na^+ > K^+ > Li^+ > NH_4^+$. For the anions, the order was $CO_3^- > SO_4^- > Cl^-$. AS

1967

Hernandez (E) and Baker (RA). **Candelilla wax emulsion, preparation and stability.** *Journal of Food Science* 56(5): 1991: 1382-1383, 1387

Wax in water emulsions were prepared with candelilla wax using a modified conventional method of high pressure homogenization for foods. The resulting emulsions were compared to coconut oil-in-water emulsions. A model based on spectra absorbance analysis was used to evaluate creaming rates of wax-in-water emulsions as well as coconut oil-in-water emulsions, prepared at different homogenization pressures. Creaming rates for wax-in-water emulsion were lower than for oil-in-water emulsion. Wax-in-water emulsions preprared at 4100 kPa produced suspended globules of 1.89 μm in size; emulsions prepared at higher homogenization pressures produced smaller average particle sizes, i.e., 0.66 μm at 27560 kPa. AS

1968

Arora (DK), Hansen (AP) and Armagost (MS). **Sorption of flavour compounds by low density polyethylene film.** *Journal of Food Science* 56(5): 1991: 1421-1423

The interactions of aldehydes, methyl ketones, methyl esters, S compounds and alkylpyrazines with LDPE film were investigated. LDPE film, suspended on a stainless steel support, was immersed in simulated milk ultrafiltrate containing a flavour compound. After shaking the glass bottles containing the sol. and film samples for 24 h at room temp. (24 plus or minus 2 C), the flavour compound was extracted from both the LDPE samples and the SμF, and quantitated using GC. The sorption was: aldehydes (C_7 - C_{10}) 11% to 63%, methyl ketones (C_7 - C_{10}) 1.5% to 43.0%, methyl esters (C_7 - C_9) 6.0% to 42.0%, and S compounds 8.5% to 21%. Insignificant levels of alkylpyrazines were sorbed. For all flavour compound classes, as carbon chain length increased, the quantity of sorbed flavour compounds increased. AS

Chemistry (Analytical)

1969

Prabhakara Raju (RV) and Raghava Naidu (R). **A new spectrophotometric method for the determination of fenvalerate (synthetic pyrethroid).** *Journal of Food Science and Technology (India)* 29(4): 1992: 260-261

A new spectrophotometric method, developed for the detn. of fenvalerate (cyano (3-phenoxyphenyl) methyl 4-chloro-α-(1-methyl ethyl) benzene acetate (51630-58-1), involves the hydrolysis of fenvalerate under alkaline conditions and the coupling of liberated aldehyde with 2,4-dinitrophenylhydrazine to yield a chromophore (λ_{max} = 465 nm). Beer's law is obeyed in the range 0.1 - 3.0 p.p.m. The method is sensitive (Sandell sensitivity = 0.0048) and it could be successfully used for the detn. of fenvalerate in water sources and formulations. AS

1970

Sapp (RE) and Davidson (SD). **Microwave digestion of multi-component foods for sodium analysis by atomic absorption spectrometry.** *Journal of Food Science* 56(5): 1991: 1412-1414

Microwave digestion of a variety of low-Na dinners was evaluated for determining Na content. Dinners containing a meat, vegetable and dessert portion were blended, digested with strong acid in the microwave oven, and read by atomic absorption. Na values were compared with those obtained by an FDA method. Also, a Na standard of known concn. was added to some samples, and the recoveries measured for two different amounts added. Reproducibility of microwave digestion was tested on replicates analyzed on the same day, on consecutive days and on consecutive wks. Of the 10 dinner types tested no matrix effects or interferences were noted, and it was concluded that the microwave digestion is a rapid means of preparing a complex matrix such as a frozen dinner for Na analysis. AS

FOOD MICROBIOLOGY AND HYGIENE

Microorganisms

Bacteria

1971

Styles (MF), Hoover (DG) and Farkas (DF). **Response of *Listeria monocytogenes* and *Vibrio parahaemolyticus* to high hydrostatic pressure.** *Journal of Food Science* 56(5): 1991: 1404-1407

Listeria monocytogenes Scott A and CA, were subjected at 23 C to hydrostatic pressures ranging from 2,380 to 3,400 atm and *Vibrio parahaemolyticus* T-3765-1 from 680 to 1,700 atm. For *L. monocytogenes* Scott A, pressurization in ultra-high temp.-processed (UHT) milk and raw milk appeared to provide a protective effect and lessened cell death as compared to pressurization in phosphate-buffered saline (100 mM, pH 7.0). A population of about 10^6 CFU/mL *L. monocytogenes* was killed by exposure to 3,400 atm within 80 min at 23 C in UHT milk. A population of about 10^6 CFU/mL *V. parahaemolyticus* was killed by

exposure to 1,700 atm within 10 min at 23 C in clam juice. AS

1972
Zechman (LG) and Pflug (IJ). **Bacillus stearothermophilus spore recovery altered by media concentration and formulation.** *Journal of Food Science* 56(5): 1991: 1408-1411, 1414

Bacillus stearothermophilus spores, subjected to a range of heating times and temp. were recovered using dextrose tryptone agar and soybean casein digest agar, with and without additives, at normal and reduced concn. Results showed that a reduction in medium concn. increased recovery of heat-stressed spores. The heated spores were inhibited by 0.5% (w/v) NaCl, based on increased recovery using 1.0 TS (1.5% tryptone and 0.5% soytone) compared to 1.0 TSN (0.15% tryptone, 0.05% soytone and 0.05% NaCl). Considering the various media tested variations of tryptic soy agar (TSA) at 0.1 of manufacturers' recommended concn. resulted in increased numbers of recovered spores. Greatest recovery was obtained using 0.1 TSA, 0.1TSAS (TSA with starch) and 0.1 TSABS (TSA with dextrose, dipotassium phosphate and starch) with none being significantly better. SRA

Lactococcus lactis

1973
Libudzisz (Z) and Galewska (E). **Citrate metabolism in *Lactococcus lactis* subsp. lactis var. diacetylactis strains.** *Die Nahrung* 35(6): 1991: 611-618

The formation of diacetyl, acetoin, 2,3-butylene glycol, acetaldehyde, ethanol and lactic acid during 24 h of cultivation in milk with 0.19 and 0.5% of citrate has been studied. Depending on the strain, bacteria produced 1.5 - 1.9 mg of diacetyl, 212 - 311 mg of acetoin and 137 - 156 mg of butylene glycol in 1 l milk. An increase of the citrate concn. in milk to 0.5% resulted in an increase in the production of diacetyl from 58 to 74% and of acetoin by 2.8 - 3.7 times. The strains of distinct activity of acetoin reductase produced in these conditions 2.3 - 2.7 times as much as 2,3-butylene glycol. The recovery of citrate in the form of C_4-compounds ranged from 76 to 98%, yet barely 0.18 - 0.44% in the form of diacetyl. Increased concn. of citrate in milk stimulated the production of diacetyl and acetaldehyde to the similar extent, thereby it did not result in the deterioration of organoleptic qualities of starters and milk products. Within the doses used citrate did not significantly affect growth and acidifying activity of the bacteria. AS

Fungi

Mucor miehei

1974
Bhirud (VS), Subrahmanyam (VVR) and Vaidya (SD). **Influence of reaction media on esterification catalysed by *Mucor miehei* lipase.** *Journal of the Oil Technologists Association of India* 23(3): 1991: 44-47

During the lipase catalysed esterification, partial removal of water from reaction media by applying vacuum, either intermittently or continuously, is essential to get high degree of conversion. High free fatty acid (FFA) containing rice bran oil can be esterified with added glycerol to produce oil with low FFA by reducing the concn. of water in the reaction media, but in presence of chlorinated solvents, product having over 55% 1-monoglycerides is obtained. SRA

1975
Bhirud (VS), Subrahmanyam (VVR) and Vaidya (SD). **Alkylation of primary amines with fatty alcohols using immobilized *Mucor miehei* lipase as catalyst.** *Journal of the Oil Technologists Association of India* 23(3): 1991: 47-48

Stearyl amine, which has 94.3% primary amines, after reacting with octyl-, decyl-, lauryl-, and myristyl alcohol for 96 h were lowered to 59.0, 54.4, 39.98 and 19.3% respectively and the corresponding secondary amine contents were 32.3, 38.0, 51.12 and 40.9% respectively. With myristyl alcohol, 35.0% of tertiary amine was formed while it was < 6% for the other three alcohols. Using immobilized *Mucor miehei* lipase, as catalyst, asymmetric tertiary amine could be produced as done with myristyl alcohol. Alkylation was neither affected by excess use of alcohol nor by the batch size. It is concluded that *Mucor miehei* lipase can be used for alkylation of amines, and asymmetric secondary amines of high degree purity could be produced when the products are subjected to vacuum fractional distillation. KAR

BIOTECHNOLOGY

Nil

TISSUE CULTURE

Nil

1976

Suresh (P), Ingle (VK) and Vijayalakshmi (V). **Antibacterial activity of eugenol in comparison with other antibiotics.** *Journal of Food Science and Technology (India)* 29(4): 1992: 254-256

The antibacterial activity of eugenol was tested and compared with that of various antibiotics of known concn. against several Gram positive and Gram negative microorganisms. The results showed that eugenol possessed property of inhibiting the growth of microorganisms *in vitro* at a concn. of 5 g per assay. It was found to be sensitive against organisms like *Escherichia coli*, *Enterobacter sakazaki* and *Klebsiella pneumoniae* which were resistant to antibiotics like Ampicillin, Erythromycin and Sulphamethizole. AS

Antioxidants

1977

Economou (KD), Oreopoulou (V) and Thomopoulos (CD). **Antioxidant activity of some plant extracts of the family Labiatae.** *Journal of the American Oil Chemist's Society* 68(2): 1991: 109-113

The antioxidant activities of methanol extracts of oregano, dittany, thyme, marjoram, spearmint, lavender and basil were tested in lard stored at 75 C. The concn. of extracts in lard varied from 0.01 to 0.20%. Oregano extract was found to be the most effective in stabilizing lard, followed by thyme, dittany, marjoram and lavender extracts, in decreasing order. The induction period of lard increased with antioxidant concn. After the induction period, peroxide formation proceeded rapidly, following pseudo-zero order reaction kinetics. The rate of the reaction decreased slightly with increasing plant extract concn. Combined addition of plant extracts in lard showed a low synergistic action between thyme extract and spearmint extract. AS

1978

Kashima (M), Cha (G-S), Isoda (Y), Hirano (J) and Miyazawa (T). **The antioxidant effects of phospholipids on perilla oil.** *Journal of the American Oil Chemist's Society* 68(2): 1991: 119-122

Antioxidant effect of phospholipids on the oxidation of refined perilla oil (PO: α- 18:3, 54.5%; 16:0, 7.2%; 18:0, 2.6%; 18:1, 18.6%; 18:2, 15.5%, tocopherol-free (POF) and tocopherol-enriched (POR) perilla oil were investigated by measuring wt.-gains and by the oven test at 37 C. The oxidative stability of PO was especially increased by additions of phosphatidylethanolamine (PE) and phosphatidylserine (PS), but phosphatidylcholine (PC) scarcely showed an antioxidant effect. The oxidative stability of POF was markedly low, and none of the phospholipids (PC, PE, PS) showed an antioxidant effect on the oxidation of POF. The stability of POR was lower than that of PO regardless of its higher tocopherol contents. However, the oxidation of POR was significantly supressed by additions of PE and PS, as was observed with PO. PC showed a small antioxidant effect on the oxidation of POR. Therefore, it seems that the antioxidant effects of phospholipids, especially of PE and PS, was due to the presence of tocopherols in the perilla oil. AS

1979

Chimi (H), Cillard (J), Cillard (P) and Rahmani (M). **Peroxyl and hydroxyl radical scavenging activity of some natural phenolic antioxidants.** *Journal of the American Oil Chemist's Society* 68(5): 1991: 307-312

The autoxidation of linoleic acid dispersed in an aqueous media and the antioxidant effect of hydroxytyrosol, oleuropein, caffeic acid and tyrosol were studied. Linoleic acid autoxidation rate was estimated by the increase of conjugated diene level and by the decrease of linoleic acid content in the samples. The phenolic compounds exhibited an antioxidant activity which increased in the order:tyrosol < caffeic acid < oleuropein < hydroxytyrosol. The analysis of the hydroperoxide isomers pointed out that hydroxytyrosol, oleuropein and caffeic acid at a concn. of 10^{-4} M inhibited the formation of *trans-trans* isomers in the increasing order: caffeic acid < oleuropin < hyroxytyrosol. This inhibition could be related to the ability of phenolic compounds to scavenge peroxyl radical. Tyrosol did not inhibit the formation of *trans-trans* isomers. Phenolic compounds were degraded as a consequence of their antioxidant activity and their degradation rate was positively correlated to their antioxidant efficacy. These phenolic compounds, at a concn. of 6×10^{-3} M, also scavenged hydroxyl radical, with an efficiency which increased in the order: tyrosol < hydroxytyrosol < oleuropein < caffeic acid. Polar substitutents at the para position, such as in caffeic acid and oleuropein, were correlated with higher hydroxyl radical quenching ability. AS

Colourants

1980

Lauro (GJ). **A primer on natural colours.** *Cereal Foods World* 36(11): 1991: 949-953

Annatto, turmeric, beet juice, paprika, cochineal/carmine, grape skin extract and caramel are the colourants covered in this article. BV

1981

Sudhir Singh and Khanna (SK). **Toxicological evaluation of non-permitted food colours - a review.** *Indian Dairyman* 44(4): 1992: 189-192

Toxicity produced by non-permitted food colours such as Auramine (C.I. Basic yellow 2), Blue VRS (CI Feed Blue 3), Malachite green (C.I. Basic green 4), Metanil yellow (C.I. Acid yellow 36), Orange II (C.I. Acid orange 7), Rhodamine B (C.I. Food red 15) are reviewed. 25 references. GS

CEREALS

1982

Sandberg (A-S) and Svanberg (U). **Phytate hydrolysis by phytase in cereals: Effects on *in vitro* estimation of iron availability.** *Journal of Food Science* 56(5): 1991: 1330-1333

Wheat bran and whole meal flours of rye and oats were soaked at optimal conditions for phytate activity (55 C, pH 5) for different time intervals. Phytate and its degradation products were determined by HPLC and related to Fe solubility under simulated physiological conditions. Small amounts of phytate (< 1 µmol/g) had a strong negative effect on Fe solubility. When inositol hexa- and pentaphosphates of wheat bran and rye flour were completely hydrolysed by activating endogenous phytase, Fe solubility under simulated physiological conditions increased from 3 to 53% (wheat) and 5 to 21% (rye). Addition of wheat phytase to uncooked oatmeal increased Fe solubility from 4 to 11 and in precooked to 18%, while endogenous phytase of uncooked oatmeal had less effect on phytase digestion and Fe solubility. SRA

Rice

1983

James (J). **Rice-husk-ash cement - A review.** *Journal of Scientific and Industrial Research* 51(5): 1992: 383-393

The use of silica from rice-husk for the production of various materials, including rice-husk ash-lime binder has gained significance. In this context, potential uses of husk, nature of silica in husk, thermal degradation of husk, crystallization of silica in husk, physicochemical properties of silica ash; reactivity of silica in ash; reaction product in ash-lime-water system; kinetics and mechanism of ash-lime reaction; processes for producing lime-rice-husk ash cement; performance of rice-husk ash cement; hydration chemistry of rice-husk ash cement and the optimum ash/lime ratio for getting good performance of ash-lime cement have been reviewed. 107 references. KAR

1984

Semwal (AD) and Arya (SS). **Effect of spices and salt on the storage stability of precooked dehydrated rice.** *Journal of Food Science and Technology (India)* 29(4): 1992: 210-213

Effect of 19 spices (1%), NaCl (0.5 - 2%) and transition metal ions (Fe^{++}, Cu^{++}, Co^{++}, Ni^{++} each at 5, 50 and 500 p.p.m.) on the storage stability of pre-cooked, dehydrated rice processed using refined sunflower oil and vanaspati was investigated. All the spices except *Tejpat* (*Cinnamomum tamala*) exhibited antioxygenic activity in dehydrated rice as well as pure sunflower oil and vanaspati. Red chilli, clove mace and nutmeg exhibited max. antioxygenic activity. *Tejpat*, on the other hand, exhibited pro-oxygenic activity in all the systems. In dehydrated rice, NaCl exhibited slight pro-oxygenic activity but Cu^{++}, Fe^{++} and Co^{++} exhibited very strong pro-oxygenic activity. Only at 500 p.p.m. level Ni^{++} exhibited marginal antioxygenic activity. Nature of the oil used during processing also significantly influenced the stability of dehydrated rice and antioxygenic or pro-oxygenic activity of the spices and metal ions. AS

1985

Hamaker (BR), Griffin (VK) and Moldenhauer (KAK). **Potential influence of a starch granule-associated protein on cooked rice stickiness.** *Journal of Food Science* 56(5): 1991: 1327-1329, 1346

The amount of a 60 Kdal starch granule-associated protein, or waxy gene product, found in milled white rice was examined in relation to cooked rice stickiness. For 32 rice selections the correlation coeff. was similar though slightly lower for the 60 Kdal protein and stickiness ($r = -0.85$, $P < 0.01$) compared to amylose and stickiness ($r = -0.87$, $P < 0.01$). The 60 Kdal protein content correlated highly with amylose content ($r = 0.96$, $P < 0.01$), suggesting a more clear association between amylose and texture. The gelatinization properties of the starch granule may be influenced by the relative amount of granule-associated protein. SRA

Wheat

1986

Syed (HM), Indoni (SB), Annapure (SG) and Bodhankar (SS). **Physico-chemical**

characterisitcs of Indian wheats - a review. *Indian Miller* 22(5): 1992: 27-31

A brief review covers physical parameters, protein content, gluten content and mineral content of the Indian wheat. 36 references. SRA

Wheat flour

1987

Indrani (D) and Venkateswara Rao (G). **Effect of milling methods on the chemical, rheological and breadmaking characteristics of whole wheat flour.** *Journal of Food Science and Technology (India)* 29(4): 1992: 218-220

Whole wheat flour obtained by milling wheat in hammer, disc, stone and roller mills showed considerable variation in particle size distribution. The damaged starch content and diastatic activity ranged from 10.7 to 21.2% and from 187 to 380 mg of maltose/10g of flour respectively thereby reflecting variation in degree of severity of grinding in different mills. The dough raising capacity was also affected with the values ranging between 53.4 and 79.6%. The dough properties of flours showed considerable variation and the water absorption varied from 64.9 to 72.6%. Bread samples prepared from hammer and roller milled flours were better in quality than those from disc and stone milled flours. AS

MILLETS

Corn

1988

Sinha (R) and Sharada (D). **Chemical characterisitcs of maize grains and their relationship to *roti* quality.** *Journal of Food Science and Technology (India)* 29(4): 1992: 243-245

Protein, starch and sugar contents were found to decrease upon alkali treatment of maize grains in contrast to increase in amylose and ash contents. Untreated *rotis* of all var. were found significantly more acceptable than treated *rotis*. Significant correlation of protein, starch and total sugars with *roti* qualities was identified. AS

Corn flour

1989

Huang (CJ) and Zayas (JF). **Phenolic acid contributions to taste characteristics of corn germ protein flour products.** *Journal of Food Science* 56(5): 1991: 1308-1310, 1315

Corn germ protein flour (CGPF) was subjected to three treatments (ethanol-washing, heat treatment and acid-washing) to remove phenolic compounds. Eight phenolic acids in the extracts of CGPF samples were identified and quantified by GC. o-Coumaric, p-coumaric, and ferulic acids were the principal phenolic acids in the free and soluble ester fractions of CGPF products. Taste thresholds for the acids were 20, 48 and 90 p.p.m., respectively. Treatments generally improved sensory properties, but acid washing increased sour scores. SRA

Sorghum

1990

Subramanian (V), Seetharama (N), Jabunathan (R) and Venkateswara Rao (P). **Evaluation of protein quality of sorghum (*Sorghum bicolor* (L.) Moench).** *Journal of Agricultural and Food Chemistry* 38(6): 1990: 1344-1347

PULSES

1991

Idouraine (A), Yensen (SB) and Weber (CW). **Tepary bean flour, albumin and globulin fractions functional properties compared with soy protein isolate.** *Journal of Food Science* 56(5): 1991: 1316-1318, 1326

The tepary bean flour (TF) and tepary proteins had good functional properties. Teparies albumin (TA) and teparies globulin (TG) showed high protein solubility at acid and alkaline pH ranges and a low solubility at pH 4 and pH 5-6, respectively compared to soy protein isolate (SPI). Viscosity of both fractions was similar and markedly lower than that of SPI. Heating to 60 C increased viscosity in all, except in TG where it decreased. Heat coagulability and foaming properties was high in TA and TF. TG did not coagulate upon heating to 100 C. TG also formed a weaker and less stable foam and showed lower emulsion capacity than TF, TA and SPI. Oil absorption capacity was excellent to good in TA and TG fractions. SRA

1992

Vidal-Valverde (C) and Frias (J). **Legume processing effects on dietary fiber components.** *Journal of Food Science* 56(5): 1991: 1350-1352

Effects of different processes were studied on neutral detergent fiber (NDF), acid detergent fiber (ADF), hemi cellulose (HMC), cellulose (CL) and lignin (LN)

content of legumes. Chickpeas, kidney beans and lentils were soaked and cooked, simulating home processing. Values were recorded on a wet basis as a guide to calculating their contribution to the diet. Normal cooking of chickpeas and kidney beans, led to higher NDF and HMC. LN increased with pressure cooking. The fiber components in lentils did not undergo any significant variation with type of cooking. SRA

Cowpeas

1993

Okechukwu (PE), Rao (MA), Ngoddy (PO) and McWatters (KH). **Thermal processing of cowpea slurries.** *Journal of Food Science* 56(5): 1991: 1302-1307

Simple heating curves were obtained during the heating of slurries containing 15 - 30% cowpea flour. A 10% cowpea slurry at 121 C showed broken heating with two break points, one break due to gelation of protein and starch at 66 C and another due to loss of rigidity at 87 C. The f_h and j_h parameters were independent of particle size of cowpea flour. The difference in F_o at the can center and the slowest heating point were as much as 29%. SRA

Cowpea flour

1994

Okechukwu (PE), Rao (MA), Ngoddy (PO) and McWatters (KH). **Flow behaviour and gelatinization of cowpea flour and starch dispersions.** *Journal of Food Science* 56(5): 1991: 1311-1315

The flow behaviour of a 25% cowpea slurry with 8% oil held at 70 C showed shear-thinning behaviour and an Arrhenius temp. relationship. Cowpea flour (8%) and starch (2.5%) slurries heated for < 1 min at 70 - 87 C exhibited shear-thickening while those heated longer times exhibited shear-thinning behaviour. Max. viscosities attained due to heat-induced gelatinization showed a power relationship with temp. of heating. Starch gelatinization kinetics followed a first-order equation and the temp. dependence of the rate constant followed the Arrhenius relationship with an activation energy of about 47.5 kcal/mol. Heating the slurries for > 200 min above 80 C resulted in loss of viscosity. AS

Faba beans

1995

Ziena (HM), Youssef (MM) and El-Mahdy (AR). **Amino acid composition and some antinutritional factors of cooked faba beans (*Medammis*): Effects of cooking temperature and time.** *Journal of Food Science* 56(5): 1991: 1347-1349, 1352

Easy-and hard-to-cook bean seeds were cooked by different heat treatments (100 - 125 C for 1 - 12 h). Amino acid composition, tannins, phytic acid and trypsin inhibitor activity (TIA) were determined. Almost all essential amino acids declined after cooking. Less than 10% of total tannins were decomposed during cooking, while up to 50% were leached to the cooking liquor. Retention of phytic acid in cooked beans was significantly lower than in cooked bean-liquor mixtures. Loss of phytic acid due to leaching was much higher for easy-to-cook beans than for hard-to-cook ones. Apparent retention of TIA amounted to about 50%. Optimum heat treatments were 125 C at 1 h for easy and 120 C at 2 h for hard-to-cook beans. AS

OILSEEDS AND NUTS

Canola

1996

Owusu-Ansah (YJ) and Marianchuk (M). **Microwave inactivation of myrosinase in canola seeds: A pilot plant study.** *Journal of Food Science* 56(5): 1991: 1372-1374, 1406

The study indicates that microwave heating could be used to completely inactivate myrosinase in whole or flaked canola seeds. The parameters for inactivation were exposure time and power. The exposure time needed for enzyme inactivation at a specific power was moisture-dependent. For constant, single processing conditions, moisture content of 10 - 16% and medium to high microwave power appeared ideal. Microwave treatment caused significant increase in the yellow colour and sulphur content of the seed oils. SRA

Groundnuts

1997

Chiou (RY-Y), Shyu (S-L) and Tsai (C-L). **Characterization of gamma-irradiated peanut kernels stored one year under ambient and frozen conditions.** *Journal of Food Science* 56(5): 1991: 1375-1377

γ-Irradiated (at 0, 2.5, 5.0, 10 and 20 kGy) peanuts lost germination capabilities after 1 yr storage. Peanuts irradiated with 2.5 kGy and stored at

ambient temp. contained viable molds. Peanuts oil in kernel stored at -14 C was comparatively more stable than in peanuts stored at ambient temp. Irradiation did not show any effect on oxidation of oil. Fatty acid content varied slightly with exception of linoleic and lenolenic acids which decreased with increased radiation depending on storage temp. Peanut proteins analysed by SDS-PAGE showed no obvious qualitative variation among the samples subjected to various doses of γ-irradiation. SRA

1998

Kim (N-K) and Hung (Y-C). **Mechanical properties and chemical composition of peanuts as affected by harvest date and maturity.** *Journal of Food Science* 56(5): 1991: 1378-1381, 1392

The effects of harvest date and maturity (by the Hull Scrape method) on the mechanical properties and the chemical composition of peanuts and the test hypothesis that peanut mesocarp colour could be used as an index to group peanuts with similar qualities were evaluated. In general, peanut kernels became harder, crisper, crunchier and more brittle at higher DAP's (days after planting) and higher maturity. Moisture content at harvest decreased, protein content remained unchanged and carbohydrates decreased with increasing DAP, harvest dates did not affect oil and ash. Total unsaturated fatty acids content increased with maturity. Qualities of peanuts in orange, brown and black maturity groups were very similar. The larger the portion of peanuts with orange, brown or black mesocarp colour, the higher would be the quality of the particular batch of raw peanuts. SRA

1999

Bhagya (S), Prakash (V) and Srinivasan (KS). **Effect of different proteolytic enzymes on the nature of subunit composition of arachins from groundnut (*Arachis hypogaea* L.).** *Indian Journal of Biochemistry and Biophysics* 29(2): 1992: 154-159

Results of this study indicated that eventhough the gross conformation and other physico-chemical properties of the arachins from 3 different (Spanish improved, TMV-2, and DH-3-30) var. were similar, the hydrolysis of proteins by the 3 proteolytic enzymes differed in their rate as well as extent. This can only be attributed to the nature of acidic and basic subunits of arachins in the 3 var. This is also confirmed by difference in their amino acid composition, especially in tyrosine, glutamic acid, alanine and cysteine, with possible role in the stereo-specificity of the enzymes. SRA

Rapeseeds

Rapeseed proteins

2000

Kroll (J). **Selected functional properties of detoxified rapeseed protein preparations effected by phytic acid.** *Die Nahrung* 35(6): 1991: 619-624

Detoxified rapeseed protein preparations with high protein content (> 90%) produced by extraction, ultra- and diafiltration, have a very good solubility and excellent foaming properties (better than egg white). The emulsifying properties (emulsifying activity and emulsion stability) are moderate. The N-solubility profile of these preparations (albumin and globulin mixing) has been influenced by phytic acid (PA). It is possible to observe a shift of the isoelectric range to lower pH-values and parallel a decrease of solubility if the amount of PA (3, 5, 10%) is increased. The foaming properties have also been dependent on the PA content. A higher concn. of PA (3, 5, 10%) causes a decrease in the foaming activity. The results have been discussed concerning the interactions between PA and proteins. AS

Safflowers

2001

Binder (RG), Benson (ME) and Flath (RA). **Volatile components of safflower.** *Journal of Agricultural and Food Chemistry* 38(5): 1990: 1245-1248

2002

Gupta (RK), Khanna (KR) and Banerji (R). **Variation in fatty acid composition of Indian cultivars of safflower (*Carthamus tinctorius* L.).** *Journal of the Oil Technologists Association of India* 23(3): 1991: 56-57

Fatty acid composition of 37 lines of Indian safflower is reported. The oil ocntent of 15 samples ranged from 24 - 29%; others had > 30% oil content. All the oil samples had palmitic (16:0), oleic (18:1) and linoleic (18:2) acids, as the common fatty acids, while stearic (18:0) was found in only 15 samples. The sum of concn. of oleic and linoleic ranged from 85.42% in S-83 to 94.54% in S-99; the exception being SJ-22 (39.98%). Based on the fatty acid composition, the genotype S-48 was selected as the most promising for developing high oleic acid lines suitable for Indian conditions. SRA

Sesame

2003

Razia Tasneem and Prakash (V). **The nature of the unhydrolysed fraction of *Alpha*-globulin, the major protein components of *Sesamum indicum* L. hydrolysed by *Alpha*-chymotrypsin.** *Indian*

Journal of Biochemistry and Biophysics 29(2): 1992: 160-167

Alpha-globulin, the high mol. wt. protein fraction from sesame (*Sesamum indicum* L.) seed, was hydrolysed by *alpha*-chymotrypsin. The hydrolysate was resolved into two fractions, the hydrolysed part and the unhydrolysed part of *alpha*-globulin using gel filtration on Sepharose 6B-100. The unhydrolysed *alpha*-globulin residue was characterized for its sedimentation coeff., subunit composition, fluorescence omission spectrum, secondary structure, and other biophysical properties. The results indicated a decrease in the size of the protein molecule upon hydrolysis to a very small extent. The effect of hydrolysis products on hydrolysis of native *alpha*-globulin as well as on a standard substrate, casein, was also investigated. The results indicated that the hydrolysis products contribute to the resistance of *alpha*-globulin to proteolysis by *alpha*-chymotrypsin to the extent of nearly 40%. AS

Soybeans

2004

Charjan (SKU) and Tarar (JL). **Effect of storage on germination and microflora of soybean (*Glycine max*) seed.** *Indian Journal of Agricultural Sciences* 62(7): 1992: 500-502

Soybean with 9% moisture content was stored in jute, cloth and polyethylene (700 guage) bags (20 x 30 cm size) for 18 months at 10.6 - 43.4 C and 35.8 - 87.3% rh and observations were recorded for germination and incidence of mycoflora at 6-month intervals. Fungi incidence was max. in soybean stored in cloth and jute bags. Polyethylene bag provided good protection to soybean seeds and prevented the development of fungal colonies both quantitative and sp. wise. With the advancement of storage the incidence of various fungi increased. KAR

2005

Clark (PK) and Snyder (HE). **Hydroperoxide formation in soybean seeds during storage.** *Journal of the American Oil Chemist's Society* 68(5): 1991: 346-347

'Forrest' soybeans were stored for 2 yrs, and the extracted lipids were assayed for hydroperoxide content. The crude lipid was separated by HPLC, and 3 hydroperoxide peaks plus the triglyceride peak were measured every 2 months. There was a lag in hydroperoxide production for the first 9 months followed by a steady increase for the remaining 22 months. This method of measuring changes in lipid oxidation should be useful for monitoring seed changes in germination and vigor during storage. AS

Soy products

Soy flour

2006

Kulkarni (SD), Wijeratne (WB) and Wei (TM). **Production of medium fat soy flour by dry-extrusion-expelling of raw soybean and its use in bread fortification.** *Journal of Food Science and Technology (India)* 29(4): 1992: 220-223

Dry heat treatment of soybean through dry-extrusion-expelling was used to produce medium fat soy flour. The flour of the cake obtained after expelling the extrudate of coarsely ground soybean contained 3.3 - 5.3% moisture and 7 - 9% oil, while trypsin inhibitor was inactivated to an extent of 35.5 - 46.8%. Soy flour thus obtained was used at 12% flour substitution level for making bread, which was acceptable. AS

2007

Mishra (HN) and Mukherjee (RK). **Storage stability of full-fat soy flour and soy-wheat flour blend.** *Journal of Food Science and Technology (India)* 29(4): 1992: 224-227

Raw full-fat soy flour (RSF), processed full-fat soy flour (FFSF) with and without antioxidant and soy-wheat flour (SWF) blend, stored at different temp. and rh, showed that the temp. and rh had pronounced effect on storage stability of the flours which were found to be more stable at lower temp. and rh ranges than at higher ones. Thermally processed and prepared FFSF had good keeping quality and could be stored safely for more than 4 months either alone or in combination with wheat flour. Addition of antioxidant had little effect in checking peroxide formation of the flour during the later stages of the storage. AS

Soy proteins

2008

Bernardi Don (LS), Pilosof (AMR) and Bartholomai (GB). **Enzymatic modification of soy protein concentrates by fungal and bacterial proteases.** *Journal of the American Oil Chemist's Society* 68(2): 1991: 102-105

Solubility, foaming capacity and foam stability of denatured soy protein concentrate obtained from toasted flour were improved by proteolysis with fungal or bacterial proteases. Emulsifying capacity was unchanged, but emulsion stability decreased;

bacterial protease highly improved oil absorption. Also, the bacterial protease was able to solubilize more protein and gave products which foamed more than those obtained with the fungal enzyme. However, the stabilizing properties of the bacterial modified soy protein concentrate at the air/water or oil/water interface were inferior. By limited hydrolysis up to degree of hydrolysis 10% most functional properties were improved without greatly reducing emulsion stability and water absorption. AS

2009

Kang (JII), Matsumura (Y) and Mori (T). **Characterization of texture and mechanical properties of heat-induced soy protein gels.** *Journal of the American Oil Chemist's Society* 68(5): 1991: 339-345

Heat-set gels were prepared from acid-precipitated soybean proteins at various heating temp. (80 - 100 C), protein concn. (18 - 20%), and proportions of glycinin. The gels were evaluated for mechanical parameters by means of a compression-decompression test. Gels formed at higher heating temp. and protein concn. were firm, tough and unfracturable. The elasticities of gels were similar at all protein concn. and were lower when heated at higher temp. Heating above 93 C was necessary for formation of rigid gels. The glycinin/β-conglycinin ratio affected the texture of the gels. Three-dimensional representation of the gels through factor analysis of instrumental data and calculation of factor scores was useful to evaluate the texture of the gels. AS

TUBERS AND VEGETABLES

Beet

2010

El-Makhzangy (A), Ayyad (K) and Abo-ElNile (E). **Factors affecting the production of *Saccharomyces cerevisiae* from sugar beet pulp.** *Die Nahrung* 35(6): 1991: 641-654

Factors affecting the production of *S. cerevisiae* from sugar beet pulp after acid hydrolysis were investigated. Max. yield and economic coeff. were obtained at sugar concn. of 7.15% after an incubation period of 72 h at 30 C and pH 6.0 using a mixture (1:1) of ammonium sulphate and ammonium nitrate (0.2 g/g sugar) as nitrogen source. HPLC analysis of beet pulp hydrolyzate showed that hexoses especially glucose serve as the most suitable sugars with regard to S. cerevisiae activity. AS

Brassica

2011

Poonam Aggarwal and Saini (SPS). **Chlorophyll losses during preparation, canning and storage of *Brassica* greens.** *Journal of Food Science and Technology (India)* 29(4): 1992: 258-259

Total chlorophyll content decreased to 80% of its initial value after cooking and canning and to 40 - 50%, during 6 months storage in *Brassica* greens. 'RLM-240' and 'Brown sarson' retained max. chlorophyll and Chinese cabbage contained min. chlorophyll in fresh, processed as well as stored form among the 5 var. studied. Higher chlorophyll was retained under refrigerated storage. AS

Carrots

2012

Tatsumi (Y), Watada (AE) and Wergin (WP). **Scanning electron microscopy of carrot stick surface to determine cause of white translucent appearance.** *Journal of Food Science* 56(5): 1991: 1357-1359

Carrot sticks that were prepared with a sharp culinary knife exhibited a whitish translucent appearance on the surface. This condition was not readily apparentwith carrot sticks sliced with a razor sharp blade. Scanning electron microscopic examination of the translucent tissue revealed that the knife tended to shear, separate and compress the cells and tissues of the root. Dehydration of the large mass of exposed cells probably was responsible for the appearance of the whitish translucent tissue. Development of this condition is undesirable because consumers associate this with aged or nonfresh carrot sticks. AS

Cassava

2013

Badrie (N) and Mellowes (WA). **Effect of extrusion variables on cassava extrudates.** *Journal of Food Science* 56(5): 1991: 1334-1337

Cassava flour was successfully used as feed ingredient in production of a puffed extrudate. The physicochemical characteristics of the extrudate were significantly influenced by feed moisture (FM), temp., screw speed and feed rate (FR). Optimum extrudate expansion (2.82) was obtained at 11% FM; temp., 120 - 125 C; screw speed of 520 r.p.m. with FR 250 g/min. SRA

Cassava flour

2014

Badrie (N) and Mellowes (WA). **Texture and microstructure of cassava (*Manihot esculenta* Crantz) flour extrudate.** *Journal of Food Science* 56(5): 1991: 1319-1322, 1364

Cassava flour (*Manihot esculenta* Crantz) was texturized by single-screw extrusion processing. Relationships between texture and microstructure as a function of extrusion variables were examined. The effect of feed moisture or screw speed was significant ($P < 0.01$) on all textural parameters except springiness and energy first bite. Hardness, gumminess ($P < 0.05$) fracturability and cohesiveness ($P < 0.01$) decreased with increasing temp. Hardness, fracturability and firmness were lowest at screw speed 520 r.p.m. with feed rate 300g/min. 120-125 C and 11% feed moisture. Scanning electron micrographs showed structural change from a coarse cell mass at high feed moisture to a porous, thin-walled structure with decreased feed moisture. AS

Turnips

2015

Shattuck (VI), Kakuda (Y), Shelp (BJ) and Kakuda (N). **Chemical composition of turnip roots stored or intermittently grown at low temperature.** *Journal of the American Society for Horticultural Science* 116(5): 1991; 818-822

Field and greenhouse studies were conduted to investigate the effects of low temp. on the starch, sugar, ascorbic acid, and glucosinolate (GS) concn. in turnip [*Brassica rapa* ssp. *rapifera* (Metzg.) Sinsk] roots. Field-harvested roots were stored at 0 C for 2 and 4 wks. In the greenhouse, plants were grown at 0 to 12 C for parts of 11 days before harvest. Cold-stored roots decreased in both starch and total sugar concn. (sucrose, fructose and glucose) when compared to freshly harvested roots. Greenhouse-grown plants subjected to low temp. had roots with a similar starch content but with a higher concn. of total sugars than the control. In both exp., the cold treatments induced a slight but significant increase in root sucrose concn. The ascorbic acid concn. of roots was not affected by low temp. In both the field and greenhouse studies, low temp. did not change the total concn. of the 8 major GSs identified in peeled root and peel tissues, but did alter the concn. of specific GSs. AS

Asparagus

2016

Baxter (L) and Waters (LJr). **Quality changes in asparagus spears stored in a flow-through CA system or in consumer packages.** *Hortscience* 26(4): 1991: 399-402

Asparagus spears (*Asparagus officinalis* L.) stored 28 days at 2 C in air, a flow-through controlled-atm. (CA) system, or 14 days in polymeric film consumer packages were evaluated in respect to compositional and quality changes. CA-stored spears retained more sugars, organic acids, and soluble proteins than spears stored in air. Spears stored in vented consumer packages had a useful life of 14 days, whereas those in nonvented packages started to break down after 8 days. Spears from vented packages lost more wt. but retained more sugars and organic acids than those from nonvented packages. AS

Potatoes

2017

Saikia (L) and Ranganna (S). **Determination of thermal process schedules for canned drumstick, okra, elephant yam and potato.** *Journal of Food Science and Technology (India)* 29(4): 1992: 203-209

Thermal process schedules have been evolved for canned drumstick, okra, elephant yam and potato using *Clostridium sporogenes* as the test organism. The values of thermal resistance (D) found using approx. 10^3 spores (B) were 1.75 plus or minus 0.21 times the values found using approx. 10^4 spores (A). The sterilisation values (F_0) corresponding to 3.0 min (Botulinum cook), 5D of A, or a value found by integrating D values of A and B concn. of spores did not prevent spoilage of inoculated packs. F_0 of 5.2 and 5.4 min (equal to 5D of B and experimental z) are considered adequate for commercial processing of drumstick and elephant yam respectively. Okra is best canned in acidified form. Potato requires an F_0 of 9.7 min to overcome facultative thermophilic spoilage. A procedure for interconversion of F value corresponding to experimental z value in terms of F_0 value is given. AS

Vegetables

Cucumbers

2018

McDonald (LC), Fleming (HP) and Daeschel (MA). **Acidification effects on microbial populations during initiation of cucumber fermentation.** *Journal of Food Science* 56(5): 1991: 1353-1356, 1359

Addition of acetic acid (0.067M) or calcium acetate (0.133 M) to the cover brine (1.94M NaCl) of cucumbers reduced naturally occurring *Enterobacteriaceae*, but not lactic acid bacteria (LAB), during the first 5 days after brining. Naturally occurring LAB were predominantly heterofermentative (greater than or equal to 80%) 1 day after brining and homofermentative (greater than or equal to 90%) on the 5th day. *Enterobacteriaceae* survived longer within cucumbers than in brine, particularly in nonacidified cucumbers. Starter cultures of *Lactobacillus plantarum* or *Pediococcus pentosaceus* decreased 90 - 99.9% during the first 10 h after addition and did not increase until about 30 h after brining. Obtaining predominant fermentation of brined cucumbers by added cultures was difficult due to presence of natural microflora on/in the cucumbers and the harsh environment of the brine (high salt, low nutrients). AS

Leafy vegetables

Amaranthus

2019

Bressani (R) and Garcia-Vela (LA). **Protein fractions in amaranth grain and their chemical characterization.** *Journal of Agricultural and Food Chemistry* 38(5): 1990: 1205-1209

Pumpkins

2020

Teotia (MS). **Advance in chemistry and technology of pumpkins.** *Indian Food Packer* 46(1): 1992: 9-31

The review covers major aspects like storage, chemistry and technology of pumpkins (*Cucurbita* sp.). Under storage the effect of containers and storage conditions of fertilizers, pretreatments, surface wax and keeping quality and changes taking place during storage of pumpkins are covered. The chemistry of pumpkins and its seed covered are: varietal variation in composition, and nutritional value. Preparation of raw pumpkin for processing, blanching, dehydration, canning, pumpkin beverage, jam preserve, pickle and sauce and such other products, and the utilization of seeds are covered under the technology. 97 references. GS

Tomatoes

2021

Larrigaudiere (C), Latche (A), Pech (JC) and Triantaphylides (C). **Relationship between stress ethylene production induced by gamma-irradiation and ripening of cherry tomatoes.** *Journal of the American Society for Horticultural Science* 116(6): 1991: 1000-1003

Changes in 1-amino-cyclopropane-1-carboxylic acid (ACC) metabolism induced by γ-irradiation have been studied during ripening of cherry tomatoes (*Lycopersicon esculentum* L. cv. Sweet 100) treated at the mature-green stage. Irradiation caused a sharp and trasient dose-dependent increase in ethylene production during the first 24 h that was associated with an increase in ACC synthase activity. The activity of ethylene-forming enzyme (EFE) was also stimulated but was never limiting. Nine days following irradiation, ACC metabolism was more active in irradiated fruits, with ACC being mainly directed to ethylene [80% at 3 kilogray (kGy; 1 Gray = 100 Rad = 1 $J.kg^{-1}$)] rather than to malonyl ACC (MACC). As a consequence, fruit ripening was accelerated. For doses < 1 kGy, the time required for 50% of the fruits to reach breaker stage (the onset of climateric ethylene production) was inversely correlated with radiation dose and the amount of stress ethylene produced during the first 24 h. At doses > 1 kGy, inspite of a continuous stimulation of stress ethylene production, no additional acceleration of ripening occurred. At 3- to 5-kGy doses, fruit ripening was impaired transiently with a fast subsequent recovery. As a result, a significant synchronization of fruit ripening (presumed to be caused by enhanced ethylene production) was observed. AS

2022

Dodds (GT), Brown (WJ) and Ludford (PM). **Surface colour changes of tomato and other solanaceous fruit during shilling.** *Journal of the American Society for Horticultural Science* 116(3): 1991: 482-490

Chilling of mature-green (MG) tomato fruit (*Lycopersicon esculentum* Mill. and related sp.) was investigated to determine the effect of chilling stress on surface colour during low-temp. storage. Colour measurements were made with a tristimulus colorimeter (L, a, b values), and data were analyzed by multivariate analysis of variance and canonical variates analysis. Changes in surface colour of MG fruit during chilling were not correlated overall with relative chilling sensitivity of cvs/lines: however, within standard and cherry types, chilling-tolerant fruit changed surface colour more during chilling than chilling-sensitive fruit when fruit were picked early in the season. Early harvests were less chilling-sensitive than late harvests. The number of hrs below 15.6 C in the 200 h before harvest was positively correlated with postharvest chilling sensitivity. A high vs. ambient rh during storage did not affect chilling-induced % change in colour. Tobacco mosaic virus resistance led to less and *Verticillium albo-atrum* Reinke & Berthier resistance

led to more chilling-induced colour change. There was no effect from resistances to *Fusarium oxysporum* Schlechtend f. sp. *lycopersici* (Sacc.) W.C. Snyder and H. N. Hans, alternaria stem canker (*Alternaria solani* Sorauer), anthracnose [*Colletotrichum coccodes* (Wallr.) S. J. Hughes], root-knot nematode (*Meloidogyne hapla* Chitwood), *Phytophthora infestans* (Mont.) deBary, or *Stemphyllum botryosum* f. sp. *lycopersici* Rotem, Cohen, and Wahl. The results show that the harvest date had an effect on chilling-induced changes in surface colour in MG fruit. AS

FRUITS

2023

Carbonell (E), Costell (E) and Duran (L). **Fruit content influence on gel strength of strawberry and peach jams.** *Journal of Food Science* 56(5): 1991: 1384-1387

Influence of fruit content, interaction with final soluble solids and added pectin on gel strength of strawberry and peach jams was studied. Composition ranged 25 - 55%, 60 - 70 °Brix, 0.3 - 0.7% added pectin in strawberry jams and 0.1 - 0.5% in peach jams. Gel strength was measured in a Stevens LFRA texture analyzer. Regression equations showed that in strawberry jams effect of fruit content was quadratic and interaction with soluble solids was weak and negative while in peach jams the same effect was linear and the interaction was strong and positive. No interaction of fruit content with added pectin was observed, showing those effects were independent and additive. AS

Apples

2024

Sud (G), Parmar (C) and Nayital (RK). **Effect of calcium chloride, bavistin and diphenylamine on the shelf-life of apple cv. Royal Delicious.** *Indian Food Packer* 46(1): 1992: 33-38

Apple fruits (var. Royal Delicious) after harvest were dipped in $CaCl_2$ (2 and 4%) and Bavistin (500 p.p.m.) and in diphenylamine (1000 p.p.m.) sol. for 2 min. $CaCl_2$ particularly 4% was effective in reducing the loss of fruit firmness and physiological wt., preventing the rot and maintaining the quality during 5 wk of storage at room temp. The shelf-life, which was only 2 wk under control was further extended by another 2 wk and $CaCl_2$ (4%) proved to be the best treatment. GS

2025

Lau (OL) and Yastremski (R). **Retention of quality of 'Golden Delicious' apples by controlled- and modified-atmosphere storage.** *Hortscience* 26(5): 1991: 564-566

'Golden Delicious' apples (*Malus domestica* Borkh.) were subjected to either 0 C controlled-atm. (CA) storage or to a postharvest coating of 0.1% to 2.5% Nutri-Save (NS) a polysaccharide derived from shellfish) plus air storage. NS-coated apples were greener and firmer and had higher titratable acidity (TA) and more shrivelled and injured fruit than the control after storage in air at 0 C for 5 to 6 months and ripening in air at 20 C for 7 days. Poststorage washing increased skin injury, and low rh during ripening increased shriveling of NS fruit. NS applications led to an accumulation of CO_2 and C_2H_4 and a small reduction of O_2 in the fruit core cavities. The use of 1.5% O_2 + 1.5% CO_2 in the storage atm. was more effective than NS plus air storage in maintaining flesh firmness (FF) and TA without increasing fruit shrivel or skin injury. NS treatments maintained FF and a green skin in fruit ripened in air at 20 C for 2 or 4 wks following harvest, but some shrivel was evident by 4 wks. Better retention of skin greenness was the only benefit derived from a poststorage NS treatment of CA-stored fruit during the shelf-life test. AS

2026

Kramer (GF), Wang (CY) and Conway (WS). **Inhibition of softening of polyamine application in 'Golden Delicious' and 'McIntosh' apples.** *Journal of the American Society for Horticultural Science* 116(5): 1991: 813-817

2027

Andrich (G), Fiorentini (R), Tuci (A), Zinnai (A) and Sommovigo (G). **A tentative model to describe the respiration of stored apples.** *Journal of the American Society for Horticultural Science* 116(3): 1991: 478-481

Using mathematical equations that describe the O_2 mass-transfer and the enzymatic oxidation of the organic substrates of apples (*Malus domestica* Borkh.), a kinetic model to correlate fruit respiration rate with environmental O_2 partial pressure (PO_2) was developed. The kinetic detn. were carried out at room temp. using apples stored at 3 to 4 C for 11 to 19 wks. Results show that: 1) the calculated value of the Michaelis-Menten constant related to the enzymatic oxidation of the respiratory substrate (K_m = 2.1 plus or minus $0.5.10^{-5}$ $mol.kg^{-1}$) is close to that reported in the literature for cytochrome-c oxidase; 2) the located range of PO_2 levels where O_2 becomes the limiting factor in the respiration process (near 2.6 kPa at T = 20.5 plus or minus 1 C)

is close to those usually used on a commercial scale for controlled atm. storage. AS

Avocadoes

2028

Meir (S), Philosoph-Hadas (S), Zauberman (G), Fuchs (Y), Akerman (M), Aharoni (N). **Increased formation of fluorescent lipid-peroxidation products in avocado peels precedes other signs of ripening.** *Journal of the American Society for Horticultural Science* 116(5): 1991; 823-826

Fluorescent products (lipofuscin-like compounds) of lipid peroxidation, which accumulate with age, were extracted from 'Fuerte' avocado (*Persea americana* Mill.) peels during ripening. Fractionation and analysis of these fluorescent compounds (FCs) was carried out by an improved method, based on separation of FCs from chlorophyll by Sep-Pak silica cartridges. A sharp rise in FCs content was found 2 days after harvest in avocado fruits stored at 22 C, and ethylene enhanced this rise 3-fold on the 4th day. The accumulation of FCs preceded by at least 3 days the onset of climateric ethylene and respiration and by 2 days the decrease in fruit firmness. Moreover, a 6-fold increase in the FCs concn. occurred during 1 to 2 wks of storage at 5 C, but the avocado fruits did not show any other detectable signs of ripening. These results suggest that lipid peroxidation may be regarded as one of the earliest detectable processes occurring during fruit ripening. Thus, an increase of FCs in peel may be employed as a horticultural characteristic for estimating initiation of ripening in avocado fruit. AS

Citrus

2029

Chou (TC), Pintauro (N) and Kokini (JL). **Conformation of citrus pectin using small amplitude oscillatory rheometry.** *Journal of Food Science* 56(5): 1991; 1365-1368, 1371

Conformation of citrus pectin (uronide 93%, degree of esterification, 61.5%) sol. was studied and experimental reduced storage $[G']_R$ and loss moduli $[G'']_R$ were compared with random coil theories of Rouse and Zimm and the rodlike theory of Marvin and McKinney. The theory of Zimm best approximated experimental data. This suggested that components of the pectin molecule internally interact to form a compact random coil with conformation controlled by hydrodynamic interactions. AS

Figs

2030

Pawar (SG), Kulkarni (DN), Shere (DM), Kulkarni (KD) and Patil (VK). **Effect of pretreatments on chemical composition and drying rates of solar dried figs.** *Indian Food Packer* 46(1): 1992; 39-44

Figs (*Ficus carcia* L) var. Poona and Daulatabad were dried using solar drier after pretreating with (i) sulphitation, (ii) blanching + sulphitation, (iii) blanching, and (iv) lye treatment. Protein content was not altered by pretreatments. Total and reducing sugars were higher in sulphited Poona fig than in Daulatabad fig. Crude fiber was higher in Daulatabad. The drying rates at the initial stages were similar in all the treatments but at the final stages control and (ii) showed rapid drying rate in the Poona var. In the Daulatabad var., at the final stages of drying, control and (iv) showed faster drying rates. GS

Grapefruits

2031

McDonald (RE), Miller (WR), McCollum (TG) and Eldon Brown (G). **Thiabendazole and imazalil applied at 53 C reduce chilling injury and decay of grapefruit.** *Hortscience* 26(4): 1991: 397-399

The fungicides thiabendazole (TBZ) or imazalil were applied at 1 $g.l^{-1}$ at 24 or 53 C to 'Marsh' and 'Redblush' grapefruit (*Citrus paradisi* Macf.) to reduce fruit susceptibility to chilling injury (CI) and decay. Generally, there was more CI and decay on 'Marsh' grapefruit than on 'Redblush'. Severity of CI was lower in grapefruit that had been dipped at 53 C than at 24 C. Fruit dipped in fungicides had less CI than fruit dipped in water alone. Imazalil was more effective in reducing CI than TBZ. Fungicides reduced decay at both temp., and imazalil was better than TBZ. AS

Grapes

2032

Sharma (PC), Joshi (VK) and Sharma (KD). **Preliminary studies on juice processing suitability of grapes grown under dry temperate conditions.** *Indian Food Packer* 46(1): 1992; 51-54

Juice processing suitability of three var. of grapes, (i) Katta, (ii) Chholtu Red, and (iii) Chholtu White grown under dry temperate conditions were evaluated. A suitable grape juice extraction technique was also standardised. Hot pressing gave better extraction of constituents like tannins, acids, total soluble solids and increased relative viscosity, compared to cold pressing. Clarification with pectolytic enzyme resulted in heavy settling of

sediments comprising fine pulp, tartarates and pectic substances at the bottom thereby improving the colour, body and sugar/acid/astringency blend of the juice. Extraction and clarification methods also affected the sensory qualities of the juices. Chholtu Red and Chholtu White juices were too acidic, astringent and unacceptable while Katta grape juice was superior to others, in colour, body and sugar/acid blend. GS

2033
Prakash (GS), Chadha (KL) and Reddy (BMC). **Changes in the physical and chemical composition of Kniffin trained grapes during ripening.** *Indian Journal of Horticulture* 48(4): 1991: 282-285

Changes in the berry wt., vol. and chemical constitutents were determined in Thompson Seedless, Gulabi, Black Champa and Bangalore Blue grapes, trained to 6-arm Kniffin system at weekly interval from Veraison till maturity (January 28 to March 2). Berry wt. and size increased from Veraison till harvest in all cv. except in Bangalore Blue grape. Total soluble solids and :ts ratio with acids increased steadily from Veraison till maturity. The acid content in the berries decreased steadily after veraison until maturity. SRA

Mangoes

2034
Miller (WR), McDonald (RE) and Sharp (JL). **Quality changes during storage and ripening of "Tommy Atkins" mangoes treated with heated forced air.** *Hortscience* 26(4): 1991: 395-397

Freshly harvested mangoes (*Mangifera indica* L.) treated with forced air at 51.5 C for 125 min then stored for 1, 2, or 3 wks at 12 C, followed by 21 C until soft-ripe, were compared with nontreated fruit for quality changes. Treated fruit lost 1.0% more fresh wt. than nontreated fruit and developed trace amounts of peel pitting. Total soluble soiids concn. for treated and nontreated fruit were similar (approx. 13%), as was peel colour at the soft-ripe stage. Treated fruit generally reached the soft-ripe stage approx. 1 day earlier than nontreated fruit regardless of storage duration and had a lower incidence and severity of stem-end rot and anthracnose. The trace of pitting on treated fruit likely will not influence consumer acceptance. AS

Peaches

2035
Nanos (GD) and Mitchell (FG). **Carbon dioxide injury and flesh softening following high-temperature conditioning in peaches.** *Hortscience* 26(5): 1991: 562-563

High-temp. controlled-atm. (high CO_2/low O_2) conditioning was investigated as a possible treatment to delay the incidence of internal breakdown of peaches and nectarines (*Prunus persica* L. Batsch) during subsequent cold storage. Maintaining an atm. of 5% to 15% CO_2 added to air or to 1% to 5% O_2 while conditioning peaches for 2 days at 20 C partially prevented fruit ripening (compared to fruit conditioned in air), as measured by flesh softening and loss of green pigment, while no off-flavours were detected. Conditioning of peaches at 20 C for 4 days in air or in air + 20% CO_2 was detrimental to fruit quality, as indicated by flesh softening or detection of off-flavours. AS

Plums

2036
Sharma (KR) and Thakur (NS). **Evaluation of wooden boxes fabricated from lesser valued farm tree species for packaging and transportation of plum.** *Journal of Food Science and Technology (India)* 29(4): 1992: 235-236

'Santa Rosa' plums packed in the packages fabricated from lesser valued farm tree species were transported by truck to the market covering a distance of about 400 km. All the packing cases remained intact except cracking of one side strip in each single box fabricated from the woods of *Albizia chinensis*, *Bombax ceiba* and *Ficus roxburghii*. The quality of fruits was found to be acceptable with respect to loss in net and gross wts., fruit damage, fruit firmness and total soluble solids. AS

Strawberries

2037
Paakkonen (K) and Mattila (M). **Processing, packaging and storage effects on quality of freeze-dried strawberries.** *Journal of Food Science* 56(5): 1991: 1388-1392

The surface temp. during freeze drying (from 20 to 60 C) affected the hygroscopicity of the strawberries, particularly below 0.40 a_w. Crushing before drying and low processing temp. improved sensory quality of dried strawberries and vacuum packaging improved storage stability. SRA

2038
Lesschaeve (I), Langlois (D) and Etievant (P). **Volatile compounds in strawberry jam: Influence of cooking on volatiles.** *Journal of Food Science* 56(5): 1991: 1393-1398

Volatile compounds in strawberry (*Fragaria ananassa* Duch) jam were only slightly affected by addition of sugar, but were closely related to design of the cooker and to the pressure used. Different types of behaviour were observed for the specific aromatic components. Cooker design largely influenced flavour losses at low pressures. Condensation of vapour during cooking and incorporation of the condensate in pectin sol. could result in a more flavourful product. SRA

CONFECTIONERY, STARCH AND SUGAR

Confectionery

Chocolates

2039

Joshi (NS) and Sharma (RS). **Milk chocolate.** *Indian Dairyman* 44(5): 1992: 225-230

The difference between plain chocolate and milk chocolate lies in the presence of milk solids and their sugar content. Cocoa nibs, cocoa mass, cocoa press cake, sugar, additives like emulsifiers, preservatives, flavourings and antioxidants all go into the making of milk chocolate. Use of cocoa butter is optional. Chocolate liquor is obtained by cleaning and grading, roasting, husking and winnowing and grinding of cocoa beans. This is mixed with powdered sugar, milk solids and cocoa butter. The chocolate mass is subjected to conching, storage, tempering, enrobing, moulding and packaging. GS

Sugar

2040

Rahmen (MH), Pal (SK) and Alem (F). **Effect of nitrogen, phosphorus, potassium, sulphur, zinc and manganese nutrients on yield and sucrose content of sugarcane (*Saccharum officinarum*) in flood-plain soils of Bangladesh.** *Indian Journal of Agricultural Sciences* 62(7): 1992: 450-455

The field exp. was carried out in the cropping season of 1986-87 to study the response of sugarcane to N, P, K, S, Zn and Mn fertilizers in sandy loam soils of sara series. The soil showed deficiency in N, P, S and Mn. It was found that the germination %, the number of tillers, millable canes, and yields of cane and sugar increased with the application of N, P, K, S, Zn and Mn at 150, 52, 83, 30, 8 and 5 kg/ha, respectively. Individual application of N, P, K, S and Zn increased the cane yield by 33.0, 34.4, 16.2, 16.2 and 8.7% respectively than the control. The highest net benefit was obtained with application of N, P, K, S, Mn and Zn at the rate of 150, 52, 83, 30, 5 and 8 kg/ha respectively. KAR

2041

Patel (HS), Mehta (NJ), Patel (MP) and Vashi (RD). **Effects of farm yard manures, castor cake and press mud cake on yield and quality of sugarcane.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*93-102: 1991

The exp. conducted during the 1982-83 to 1984-85 indicated that farm yard manure (FYM) at 25 t/ha or castor cake at 625 kg/ha with 250 N, 125 P and 125 K/ha increased the cane yield, sucrose % juice and net return/ha. The treatments affected the sucrose % juice. Castor cake at 625 Kg/ha with the fertilizer gave higher sucrose % (17.84) and with max. commercial cane sugar % (12.20). This also gave max. additional net return of Rs.4251/ha. GS

2042

Banwari Lal. **Effect of nitrogen levels on growth, yield and quality of sugarcane under water-limited environment.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*109-114: 1991

The field exp. conducted in 1985-86 and 1986-87 involved growing sugarcane under 4 moisture regimes (unirrigated, 25% ASM, 50% ASM and 75% ASM) with application of 75, 150 and 225 kg N/ha. Sugarcane yield was significantly increased at 75% ASM regime by 115.68%, 89.00% and 41.50%, in 1985-86 and 128.20%, 69.01% and 40.19% in 1986-87 over unirrigated, 25% ASM and 50% ASM, respectively. The yield of sugarcane was also increased by 38.03%, 24.33% and 9.57% in 1985-86 and 64.42%, 40.61% and 16.79% in 1986-87 over control, with 75, 150 and 225 kg N/ha, respectively. The quality of sugarcane did not change due to different soil moisture regimes or different N levels. GS

2043

Onkar Singh and Kanwar (RS). **Effect of crop geometry on physiological activity and juice quality of sugarcane.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*141-147: 1991

Sugarcane crop was grown with a geometry of E. to W. and N. to S. directions of rows with 60, 90 and 120 cm spacing between rows. The physiological activity and sugarcane juice quality of cv. CoJ 64 were better under 120 cm row spacing than 60 cm spacing. The crop geometry of E. to W. row direction with 120 cm row spacing is considered to be better

than N. to S. directions of rows and 60 and 90 cm spacings between rows. The sucrose, purity, CCS, electric conductivity and pH were slightly higher while reducing sugars, fibre content, gums and flavonoids of juice were lower under E. to W. than N. to S. direction of rows. GS

2044

Bhojaraj (SK). **Development of poly baffle entrainment catcher on effective device to prevent entrainment in sugar factory.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*1-14: 1991

Prevention of entrainment and arresting of entrained sugar liquors from the evaporator bodies and vacuum pans of the sugar factories has assumed greater importance. The poly baffle entrainment catcher, which is the most advanced technique comprises of multi baffle plate made of stainless steel 304 quality as a corrugated sheet having a vortex at the top and steep angle between two layers. The vapour travelling through the arrestor strikes on the corrugated surface of the baffles which changes its direction resulting in the falling of droplets of the entrained sugar liquor. This solves the problem of entrainment and the allied losses in sugar recovery. GS

2045

Jain (PF), Ahire (CN), Joshi (JT) and Baranth (AM). **Power reduction in condensing system.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*15-28: 1991

In multijet spray condenser, cold water is provided to both spray and jet nozzles. In the modified system, instead of cold water, hot water was provided through the condenser outlet. By this, quality of water to be handled in spray pond reduced and one spray pump could be stopped, which resulted in power reduction also. Expenditure involved in the modification is Rs. 100,000 and the saving in the power consumption is Rs. 117,000. GS

2046

Dixit (AN). **Optimum use of exhaust steam desuperheaters in sugar industry.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*29-38: 1991

Optimum use of desuperheaters to reduce superheated process steam temp. in sugar industries has been considered. Fixing of capillary type good quality temp. guage in incoming and outgoing steam in desuperheater, installing two recoder type flow meters, one in superheated steam line and other in water line to know actual flow of both fluids are suggested. The ratio of peripheral area of desuperheater to cross sectional area of incoming pipe should be 1.25 only. Pressure maintained at Header should be 150 psig. These modifications will yield desired results in the sugar industry. GS

2047

Phatak (RN) and Malshe (VC). **Condensate water treatment in sugar industries.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*39-45: 1991

Lowering of boiler water pH, when mixed with condensate water (for economy) is a problem faced by sugar industries. All condensate samples had pH value near neutral or alkaline. But after boiling the condensate water the contaminants (sugar or its derivatives) decompose into acidic components leading to low pH. On boiling with or without caustic, variation was observed in pH value. But boiling with 50 p.p.m. caustic showed very little effect. Addition of oxidizing agents at predetermined rate (0-20 p.p.m.); scavenger resin treatment; and desorption of organics to regenerate the resin maintained the desired pH of water. GS

2048

Kapur (PPatilVL), Gautam (GK), Vasudeva (TR), Agarwal (AK), Sai Kumar (KS), Bajaj (VD). **On-line estimation of crystallisation parameters and automatic feed control in vacuum pans.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*17-27: 1991

The salient features of the microprocessor based pan boiling instrumentation system (MIPMOS) developed by the Central Electronics Engineering Research Institute (CEERI), Pilani, specifically for low grade vacuum pans of the sugar industries, have been described. MIPMOS has helped in higher productivity, energy conservation and minimisation of losses with crystal quality improvement. The hardware and software configurations; specifications of the system, and the data collected during the field operation of the system are given. GS

2049

Bhupinder (K) and Sharma (KP). **Techno-economic development of agro-industrial based products. I. "Ready-to-serve" sugarcane juice (pure).** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*39-50: 1991

Ready-to-serve semi-processed (pasteurized and preservative added) and processed (preservative

added and sterilized) sugarcane juice, was analysed using regression techniques, during 120 days storage at 10 C, room temp. and 40 C, to find the rate of change of sugar loss, acidity development, colour and acceptability index. The rate of sucrose loss per day in stored juice was 0.042% for processed and 0.327% for semi-processed juice stored at room temp. The loss of quality of processed juice was slower than semi-processed juice during 120 days of storage at 10 C and at room temp. GS

2050

Laxmi Narayan, Rao (KSN) and Srinivas (K). **Microprocessor based control system for mixed juice flow.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*51-58: 1991

Mixed juice flow in sugar mills affects the primary heating, juice clarification, secondary heating and further processing stages. Hence, it is important in energy conversation and to achieve process efficiency. The salient features of microprocessor based flow control system using magnetic flow meter for controlling the mixed juice flow was developed and tried in sugar factory. GS

2051

Dubey (HK), Dubey (Y) and Sharma (GC). **Effect of different growth stimulating supplements on molasses fermentation by distillers yeast.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*59-63: 1991

In molasses fermentation by yeast, growth stimulating supplements like progesterone, estrogen and oxytocin stimulated the growth, sugar utilization and the rate of alcohol production and yield of alcohol. Fermentation efficiency was 93.5% for progesterone, 94.7% for estrogen, and 94.92% for oxytocin at 30 C and at 2 p.p.m. level. GS

2052

Srinivasan (S), Gunasekaran (N), Gurugovind (J) and Chandrasekar (N). **Performance of a falling film evaporator as first effect.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*1-16: 1991

Falling film vessel (FFV) when compared with Roberts type FFV, showed better steam economy and less of scaling with better efficiency. Other advantages include no expenditure on energy for upward movement of the juice, negligible retention time and avoidance of sugar loss; no boiling point elevation; no loss of temp. difference; no juice stagnation on the heating surface; provision of 75% recirculation of the juice; and no need to increase the exhaust pressure. GS

2053

Murthy (TSN). **Theory and practice of cane juice clarification in sulphitation sugar factories.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*17-23: 1991

For juice clarification in sulphitation plants important aspects to be considered include quality and quantity of lime, temp. control, sulphur dioxide, pH, Brix and use of some auxillary chemicals in getting better clarified juice or making the mud to settle faster. These are described. GS

2054

Kaliyamurthy (S) and Ramasamy (P). **Simultaneous achievement of good colour sugar and lowest final molasses purity - a novel idea.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*25-36: 1991

A new method to get lowest final molasses purity and good colour sugar is suggested. 'B' massecuite is cured in a continuous centrifugal machine without adding any water, to maintain the purity at 36. The 'B' fore sugar will be made into 'B' magma by the addition of 'B' light and this 'B' magma is cured by another continuous centrifugal machine with sufficient water washing. The additional requirement of machineries for this process is a centrifugal machine, pugmill, Mingler, magma pump, 'B' light pump and 'B' light tank at the pan floor. By the double curing of 'B' massecuite, 36 purity 'B' heavy can be had; with 'C' massecuite of 45 purity; 22, 23 purity of final molasses and good 'A' quality sugar. GS

2055

Verma (VK) and Tayagi (ID). **Selection of optimum pH of juice in juice sulphiter.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*37-46: 1991

The selection of optimum pH of sugarcane juice in juice sulphiter is done by providing an additional connection for lime in juice sulphiter by maintaining the initial pH of juice at 8.6 and by neutralising it to 7.1 pH by SO_2. This helped to reduced CaO contents in clear juice, less destruction of reducing sugar and better rise in purity from mixed juice to clear juice. It also improved the sugar colour and reduced sugar loss in molasses. GS

2056

Chauhan (SS). **Automation on juice sulphitation by controlling of SO_2 gas generation, a new approach.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*47-58: 1991

In juice clarification, manual control of pH gave variable results of clarification efficiency and chemical requirements. An automatic control system on clarification process has been developed. This involved the control of the SO_2 gas generation and lime dose. Auto control of SO_2 generation has been done by controlling the air supply to the burner with minor modification in the existing system. This has resulted in reduced sulphur and lime consumption, and increased the clarification efficiency and reduced the cleaning period. GS

2057

Shukla (BK). **Review of basic absolute sugar recovery and sugar recovery performance.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*59-65: 1991

The basic absolute sugar recovery (BASR) is used by the author to arrive at basic sugar recovery based on certain basic assumptions. The term represents 100% mills extraction and the basic sugar recovery is calculated on the basis of absolute juice % cane and its calculated value of Pol % (available boiling house recovery) and Brix % absolute juice based on certain assumption and a virtual final molasses purity 28.57. Sugar recovery is divided by BASR. Thus at the absolute juice purity of 85, Pol in cane is equal to 12.5% and fibre % in cane is equal to 12.5, the max. BASR is 11.625. This will give (BASR) the max. of 93% basic overall recovery. GS

2058

Agarwal (JKP) and Agarwal (S). **Nature of losses in a sugar factory.** *Proceedings of the 53rd Annual Convention of the Sugar Technologist's Association of India*67-72: 1991

Describes known, unknown and undetermined losses such as mechanical losses due to entertainment, leakage and spillage, incorrect weighment or measurement; chemical losses due to inversion of sucrose into reducing sugars which may be due to microbiological growth in mill beds, juice pipes, centrifugal flooring; sugar loss in evaporator from syrup to sugar stage; loss in bagasse; loss in final molasses and loss in press cake. Methods for calculating the above losses are indicated. GS

2059

Kanda (K), Yasuda (Y) and Tochikubo (K). **Germination response of *Bacillus subtilis* PC1219 spores to caramelized sugar and L-asparagine.** *Journal of Food Science* 56(5): 1991: 1399-1403

In presence of L-asparagine, effective substances in caramelized sugar were primarily glucose and fructose; isomerization of glucose/fructose was observed after autoclaving (120 C, 20 min, pH 7.2). Glucose and fructose were 63 to 24 in caramelized glucose and 12 to 44 in caramelized fructose. Apparent dissociation constants were: glucose 2.2×10^{-4}, fructose 1.3×10^{-4}, L-asparagine 2.2×10^{-4}. Hydroxymethylfurfural and maltol were not effective. Aging and heat activation of spores contributed to germination, especially for response to L-asparagine and/or fructose, but not glucose. The initiation mechanism was distinguishable from the L-alanine system in requirement for aging, heat activation of spores and response to inhibitor. L-Asparagine could be partially replaced by NH_4^+, but not by L-glutamine. AS

BAKERY PRODUCTS

2060

Abbott (J), O'Palka (J) and McGuire (CF). **Dried distillers' grains with solubles: Particle size effects on volume and acceptability of baked products.** *Journal of Food Science* 56(5): 1991: 1323-1326

Particle size distribution of sour mash dried distillers' grains solubles (DDGS) varied among producers but did not influence final vol. of quick muffins or yeast rolls. Vol. of muffins or rolls was not affected by sieve fractions, particle size distribution, grinding effects or DDGS source. Ground DDGS had little effect on baked product colour. Quick breads and yeast breads baked with DDGS produced darker colours than standard bread without DDGS. Consumer acceptability of muffins or rolls was not altered by DDGS additions (P greater than or equal to 0.05). SRA

Bread

2061

Vatsala (CN) and Haridas Rao (P). **Studies on fruit bread.** *Journal of Food Science and Technology (India)* 29(4): 1992: 213-217

Studies on fruit bread indicated that min. levels of 15.5 and 25% sugar, fat and fruit respectively were required to obtain bread with desired taste. The bread thus made had slightly undesirable hard

texture which was overcome by increasing the fermentation and proofing times from 120 to 150 and 55 to 70 min respectively. Fruit bread dough required about 6% less water as compared to that required for a normal bread dough. Fermentation rate was reduced as indicated by the Expansograph characteristics showing longer time to reach the peak (135 min) compared to normal bread dough (65 min). Fruit bread could be stored at ambient conditions of 25 - 28 C and rh of 60 - 65% after packing in polypropylene pouches (100 guage) for a longer period of 8 days without mould growth and with min. of textural changes in contrast to that for 3 days for normal bread. AS

Cakes

2062

Bell (DA) and Steinke (LW). **Evaluating structure and texture effects of methylcellulose gums in microwave-baked cakes.** *Cereal Foods World* 36(11): 1991: 941-944

Methylcellulose gums significantly improve microwave cake height, texture and moisture retention. Special testing procedures used to evaluate their effects provided statistically significant relationships between the measured responses and the independent variables, gum concn. (0 - 4% of flour wt.) and moisture added in excess of control (0 - 30% of flour wt.). BV

MILK AND DAIRY PRODUCTS

2063

Donnelly (WJ). **Applications of biotechnology and separation technology in dairy processing.** *Journal of the Society of Dairy Technology* 44(3): 1991: 67-72

The impact of biotechnology on dairy processing within the next decade are reviewed. Microbial processes, lactose fermentation, new enzyme applications (milk protein hydrolysates, special peptides, milk fat modification), accelerated cheese ripening, milk protein fractionation and antimicrobial proteins are the topics covered in this review. BV

2064

Aguilera (JM) and Kinsella (JE). **Compression strength of dairy gels and microstructural interpretation.** *Journal of Food Science* 56(5): 1991: 1224-1228

Contour plots were developed for the compression stress (at 20% deformation) of single-component, mixed and filled protein gels. Samples were made by heating and acidification from skim milk powder, SMP (0-20% TS), whey protein isolate, WPI (0-10% TS), and recombined cream, within pH 3.6 - 3.9, 4.6 - 4.8 and 5.1 - 5.3. At higher pH, WPI gels were stronger than SMP gels. WPI had a reinforcing effect on SMP gels, while small additions of SMP to WPI gels resulted in weaker mixed gels. Filled gels containing cream had higher compression strengths than mixed gels. Micrographs showed linking of casein chains by WPI strands in mixed gels and compatibility of fat globules with casein micelles in the protein network of filled gels. AS

Milk

2065

Nagarajan (L), Selvakumaran (R), Kumar (VU) and Umesh Kumar (S). **Deterioration in milk quality due to a psychrotrophic *Bacillus cereus* during storage at low temperatures.** *Chemie Mikrobiologie Technologie der Lebensmittel* 12(6): 1990: 168-170

Psychrotrophic *Bacillus cereus* survived in milk during pasteurization and grew at 4 C storage and increased proteolytic activity. Results indicate deterioration of milk quality due to *B. cereus*. BV

2066

Chavan (KD) and Kulkarni (MB). **Studies on processing properties of milk obtained from crossbred cows.** *Journal of Food Science and Technology (India)* 29(4): 1992: 245-246

The data indicated that the processing qualities of the milk are influenced by the genetic group of cows in terms of rennet and heat clotting times as well as curd tension. Microbial rennet is advantageous for quick coagulation while the milk from HF crossbred cows is more suited for formulating infant foods. AS

2067

Kanno (C), Shimomura (Y) and Takano (E). **Physicochemical properties of milk fat emulsions stabilized with bovine milk fat globule membrane.** *Journal of Food Science* 56(5): 1991: 1219-1223

Milk fat globules (MFG) were reconstituted with milk fat globule membrane (MFGM) and milk fat (MF). Viscosity of the reconstituted MFG was highest at pH 5.0 and 4 min emulsifying, and rose with an increase of MFGM between 40 - 80 mg/g fat. Adsorbed protein/unit fat increased at acid pH with increase of MFGM. The composition of proteins adsorbed on the surface of MFG was not influenced by factors of reconstitution. The size and specific surface area of globules were influenced by

emulsifying time. MFGM and MF concn., and pH. The size range of MFG prepared by standard method was 0.9 - 17 μm in diam. Median diam. was 5 μm and specific surface area was 15,600 cm^2/cm^3 of emulsion. AS

Milk products

2068

Samona (A) and Robinson (RK). **Enumeration of bifidobacteria in dairy products.** *Journal of the Society of Dairy Technology* 44(3): 1991: 64-66

A range of selective and non-selective media for enumeration of bifidiobacteria in dairy products showed that modified Rogosa agar method is the best for recovery from yoghurt-like products. BV

2069

Fu (B), Taoukis (PS) and Labuza (TP). **Predictive microbiology for monitoring spoilage of dairy products with time-temperature integrators.** *Journal of Food Science* 56(5): 1991: 1209-1215

Arrhenius and square root equations were used to model the growth of *Pseudomonas fragi*. Significant negative history effects for growth rate and positive effects on lag phase of *P. fragi* were found under nonisothermal conditions. A correlation scheme of *P. fragi* growth was developed with the time/temp. integrators (TTI) response. Both the Arrhenius and square root model fit the lag phase and the growth rate data of the microbe at constant temp. very well. Both would be needed for shelf-life prediction. The application of TTI's for dairy products is feasible despite the history effects. SRA

2070

Desai (NB), Desai (HK) and Thakar (PN). **Response surface methodology vis-a-vis optimization of sensory quality of dairy products.** *Indian Dairyman* 44(5): 1992: 237-240

The review covers Response Surface Methodology (RSM) as a technique for improving probability of success of products in the market. The 4 steps involved in RSM, considerations while making use of RSM and application of RSM in arriving at optimal sensory quality and in setting sensory standards have also been covered. 3 references. GS

Butter

2071

Schooner (F), Simard (RE) and Pandian (S). **Colorimetric assay for free fatty acids in butter using flow-injection and immobilized enzymes.** *Journal of Food Science* 56(5): 1991: 1229-1232

Butyrate kinase (BK) was extracted from *Escherichia coli* DH5 pJc7*, purified, immobilized on porous glass beads and packed in a glass tube as a biosensor coupled with a flow-injection analysis system (FIA). The limits of detection were: FIA (25 p.p.m.) and batch method (BM, 5 p.p.m.). BK is highly specific for butyric, propionic and valeric acids. Regression coeff. values were: FIA r = 0.992 and free enzyme r = 0.987. The FIA and BM were tested on butter samples with high correlation (r = 1.000) between the methods. Correlation coeff. were: r = 0.994 and r = 0.988 between acid degree value and FIA/BM. AS

2072

Garcia (HS), Amundson (CH) and Hill (CGJr). **Partial characterization of the action of an *A. niger* lipase on butteroil emulsions.** *Journal of Food Science* 56(5): 1991: 1233-1237

A commercially available lipase (*Aspergillus niger*, APF-12) was employed to hydrolyze an emulsified butteroil substrate. HPLC analyses of the reaction products indicated that short chain fatty acid residues (e.g., butyric acid) were preferably hydrolyzed at pH 5 whereas the overall rate of hydrolysis for all major fatty acids showed a pH optimum between 6 and 7. This indicated the possibility of directing the selectivity of lipolysis in butteroil to enhance production of short-chain fatty acids associated with flavour development. The optimal temp. was ca. 35 C. Different cations also affected rate of hydrolysis. AS

Cheese

2073

El-Abbassy (MZ), Aly (ME) and Taha (SN). **Effect of lecithin addition on the yield and quality of soft cheeses.** *Die Nahrung* 35(6): 1991: 633-640

The effect of lecithin added at levels of 0.025, 0.050 and 0.075% to cheese milk used in manufacture of Domiati and Kareish cheese on yield, wt. losses and quality of cheese was studied. Addition of lecithin increased cheese yield and decreased wt. losses during pickling. The bacterial content of all cheeses treated with lecithin was higher than that of control cheese when fresh and during pickling. Cheese made with added lecithin showed higher moisture, salt, fat and acidity than control cheese. The total N percentage was almost the same in all treatments. The levels of both soluble N and total volatile fatty acids in cheese containing lecithin were higher than in the control cheese. No marked differences were evaluated for flavour, body and texture of fresh

cheese made from milk with or without lecithin, while during pickling the organoleptic properties of cheese containing lecithin were improved. AS

2074

Ha (JK) and Lindsay (RC). **Volatile branched-chain fatty acids and phenolic compounds in aged Italian cheese flavours.** *Journal of Food Science* 56(5): 1991: 1241-1247, 1250

Analysis of cheeses by capillary GC revealed adequate concn. of certain branched-chain fatty acids (BCFAs) and phenols present to contribute distinctive flavours. Butyric acid-like flavours in cow's milk Romano cheese were modified by 2-methyl-butanoic and 2-ethylbutanoic acids which provided sweet, fruity notes. 4-Ethyloctanoic acid provided a characterizing goaty note to Romano cheese made from mixed goats' and cows milk. 4-methyloctanoic and 4-ethyloctanoic acids along with *p*-cresol, *m*-cresol, and 3,4-Di-methylphenol appeared responsible for sheepy notes in sheep milk Romano cheese. Phenol and cresols (o,m,p) strongly contributed phenolic and medicinal flavour notes to smoked Provolone cheese. Low concn. of BCFAs and phenols appeared to provide desirable background flavours to Parmesan cheeses. AS

2075

Chandan (RC). **Cheeses made by direct acidification.** *Indian Dairyman* 44(4): 1992: 180-188

Latin American White (LAW) cheeses are made from acidified whole milk, skim-milk, cream or mixture thereof. Ripening, shelf-life, composition, nutrient, density and uses of LAW cheeses are described. *Chhana* which is also a common acidified cheese is described with its production techniques, and its utilization in preparing *sandesh* and *rasogolla*. GS

Cheddar cheese

2076

Trepanier (G), Simard (RE) and Lee (BH). **Lactic acid bacteria relation to accelerated maturation of Cheddar cheese.** *Journal of Food Science* 56(5): 1991: 1238-1240, 1254

2077

Tewari (BD), Vipin Kumar and Singh (S). **Spray drying process for accelerated ripened Cheddar cheese.** *Indian Dairyman* 44(5): 1992: 244-248

Method for manufacture of dried cheese from Cheddar cheese and accelerated ripened curd slurry has been described. Preparation of slurry for spray drying consists of selection of cheese, blending, addition of emulsifying salts, water and other additives followed by heat processing and homogenization. The slurry is spray dried, cooled, packed and stored as powder. The cheese powder from Cheddar cheese has got bulk density 0.46 g/ml, dispersibility 34.20 g, flowability 37°, sinkability after 6 min in terms of % absorbance 1.0 and the corresponding values for powder made from accelerated ripened curd are 0.46 g/ml, 29.34 g, 40° and 0.85 respectively. Slurry obtained from blend A (cow milk Cheddar cheese ripened with microbial rennet for 8, 4-6 and 2-3 months is blended in the ratio of 1:2:1) has higher pH, titratable acidity, soluble protein, but is lower in its salt and total volatile fatty acid than that from blend B (microbial rennet, cow milk Cheddar cheese (8 months old) and accelerated ripened curd blended in the ratio of 1:3). Reconstituted cheese spread could be prepared by mixing 2 parts of powder with 3 parts of water at temp. of 50 - 55 C and indirectly heating to 65 C with constant stirring. The product is allowed to set at 8-10 C for about 3-4 min before it is served. GS

Kachhagolla

2078

Sen (DC). ***Kachhagolla* - a delicious milk sweetmeat of Bengal.** *Indian Dairyman* 44(5): 1992: 249-251

Preparation of *Kachhagolla* involves *chhana* prepared from cow's milk is kneaded and mixed with cane sugar at 30 to 35% by wt. of *chhana* in an iron karahi and cooked with controlled heating and stirring. It develops its characteristic sticky granular texture and aroma. In *kachhagolla*, moisture, fat, protein, sucrose, ash, titratable acidity, water soluble acid, free fatty acidity and free fat contents vary with the source of the market sample. Ordinarily the major constitutents will have fat 6.14 - 9.54%, protein 10.32 - 11.26%, moisture 25.14 - 28.73% and sucrose content of 29.58 - 34.76%. *Kachhagolla* is packaged in folding paper board cartons and it has a limited shelf-life of 1 to 2 days in normal and between 3 and 5 days in refrigerated temp. GS

Rasogolla

2079

Tambat (RV), Khorgade (AB), Changade (SP) and Kaloti (SV). **Effect of fat and maida levels on *rasogolla* preparation.** *Indian Dairyman* 44(4): 1992: 203-205

Cow milk was standardised to 3, 3.5, 4 and 4.5% fat levels and converted to *chhana* using 1.5% lactic acid sol. During *rasogolla* preparation, maida levels were 0, 2, 4, 6 and 8% on wt. basis of chhana.

Sensory score for colour and appearance, body and texture, flavour and taste and overall acceptability of *rasogolla* was evaluated on a 25 point scale. No remarkable changes in sensory score was observed due to various fat levels and were non significant. However, 2 and 4% maida levels recorded the highest score and were at par. Combined effect of fat and maida levels were non significant. *Chhana* yield, moisture content, fat losses in whey and coagulant sol. required for *chhana* preparation were increased with the increase of fat levels in milk. AS

Wheys

2080

Colbert (LB) and Decker (EA). **Antioxidant activity of an ultrafiltration permeate from acid whey.** *Journal of Food Science* 56(5): 1991: 1248-1250

Results of the study indicate that both acid whey and acid whey ultrafiltration (UF) permeate could be used as "natural" antioxidants in foods. Acid whey inhibited up to 90% of Fe-catalyzed oxidation phosphatidylcholine liposomes. Lipid oxidation catalysts, including Fe, lipoxidase, photoactivated riboflavin and hydrogen peroxide-activated met Mb, were inhibited by acid whey and its UF permeate. The antioxidant activity of the UF permeate increased with increasing pH (5.4 - 7.0) Use of acid whey and its UF permeate as an antioxidant would increase utilization of a major by-product of the cheese industry and would decrease whey disposal problems. SRA

Whey protein concentrates

2081

Kilara (A) and Mangino (ME). **Relationship of solubility of whey protein concentrates to thermal properties determined by differential scanning calorimetry.** *Journal of Food Science* 56(5): 1991: 1448-1449

Twelve samples of whey protein concentrates manufactured under defined conditions were analyzed for their composition. Samples were subjected to differential scanning calorimetry to determine the onset temp. and enthalpy of denaturation. Solubility of the samples at pH 7.0 was detrmined using three procedures. In each instance, solubility significantly correlated with both onset temp. and enthalpy of denaturation. Enthalpy of denaturation may serve as a predictor for solubility of proteins. AS

Milk proteins

2082

Hung (SC) and Zayas (JF). **Emulsifying capacity and emulsion stability of milk proteins and corn germ protein flour.** *Journal of Food Science* 56(5): 1991: 1216-1218, 1223

Comparative studies of corn germ protein flour (CGPF), non-fat dry milk (NFDM), whey protein concentrates (WPC), and sodium caseinate (SC) showed that they were effective protein sources in the model system in terms of emulsifying capacity (EC) and emulsion stability (ES). EC and ES of all samples increased with increased concn. of protein. A max. EC at pH 8.0 was obtained for CGPF, WPC and SC while NFDM showed a max. EC at pH about 7.0. Minimal pH effect on ES was found. No effect of incubation temp. and incubation time on EC and ES of these samples was detected. SRA

2083

Strange (ED), Van Hekken (D) and Thompson (MP). **Qualitative and quantitative determination of caseins with reverse-phase and anion-exchange HPLC.** *Journal of Food Science* 56(5): 1991: 1415-1420

Whole native caseinate (WNC) and casein (CN) fractions from preparative DE-52 cellulose urea columns were chromatographed using C-8 reverse-phase (RP) and DEAE-type anion exchange (AEx) HPLC systems. With RP, α_{s2}-CN and *k*-CN eluted first as several small peaks; α_{s1}-CN eluted later as two peaks, followed by β-CN peaks. With AEx, *k*-CN eluted early as a group of peaks, β-CN eluted next, and α_{s1}-CN and α_{s2}-CN coeluted last. Standard curves were prepared for α_{s1}-CN and β-CN using RP-HPLC and showed correlation coeff. of 0.99 and 0.98 respectively. The caseins in WNC, nonfat dry milk casein, commercial casein(ates) and caseins from milks of individual cows were determined. AS

MEAT AND POULTRY

2084

Madsen (M), Milne (JAC) and Chambers (P). **Critical control points in the slaughter and dressing of farmed crocodiles.** *Journal of Food Science and Technology (India)* 29(4): 1992: 265-267

2085

Pommier (SA). **Characterization of the increase in paleness of milk-fed veal during refrigerated storage.** *Journal of Food Science* 56(5): 1991: 1455-1456

Ninety-five Holstein bull calves raised on milk replacer were used to study the development of meat

colour during storage. Luminous reflectivity (Y) of the pectoralis profundus muscle increased an average of 22 lux units after a 3-day aging period. Forty-five-minute colour measurements correlated with a 3-day colour measurements (r = 0.69) and pre-slaguhter hemoglobin (r = 0.53), which also correlated with 3-day colour measurements (r = 0.65). Meat colour at 45 min and preslaughter haemoglobin concn. contributed significantly to predict 3-day Y values (R^2 = 0.59). However, this procedure was not accurate to predict colour of meat at 3 days after slaughter. AS

2086

Appu Rao (AG). **A stoichiometric analysis of bovine serum albumin-gossypol interactions: A fluorescence quenching study.** *Indian Journal of Biochemistry and Biophysics* 29(2): 1992: 179-182

The interaction of gossypol with bovine serum albumin, human serum albumin and n-bromosuccinimide-modified bovine serum albumin has been followed by fluorescence quenching measurements. The presence of a high affinity site (association constant K = 2.2 x 10^6 M^{-1}) for gossypol on bovine serum albumin and human serum albumin is indicated. The stoichiometry of binding for the high affinity site was evaluated using Job's method of continuous variation, thereby suggesting the formation of 1:1 complex. Modification of the tryptophan residues on bovine serum albumin does not affect the binding of gossypol to either high or low affinity site of albumin. AS

Meat

2087

Park (YW), Kouassi (MA) and Chin (KB). **Moisture, total fat and cholesterol and goat organ and muscle meat.** *Journal of Food Science* 56(5): 1991: 1191-1193

Moisture, total fat and cholesterol in liver, kidney, heart, *Longissimus dorsi* (LD) and *Biceps femoris* (BF) muscles of 2 goat breeds (Alpine and Nubian) were determined; and differences in lipids between these tissues as well as between breeds of goat were compared. Samples from goat kids fed with a complete diet containing 4 levels of Ca for 12 wk before slaughter were used for the study. Ranges of moisture (%) in liver was 68.4 - 82.9, kidney 75.8 - 85.0, heart 69.7 - 84.3, LD 74.8 - 83.2, and BF 76.0 - 84.7. The mean total fat % was liver 3.26, kidney 3.14, heart 4.32, LD 2.27 and BF 2.03 for pooled data of two breeds. The difference in cholesterol between liver and kidney was significant (P < 0.01). The two skeletal muscles contained significantly (P < 0.01 or 0.05) less cholesterol than all organ tissues. Heart contained less cholesterol (P < 0.05) than liver or kidney. Fat and cholesterol were influenced by dietary Ca, breed and tissue, while moisture was affected only by tissue. SRA

2088

Ha (JK) and Lindsay (RC). **Volatile alkylphenols and thiophenol in species-related characterizing flavours and red meats.** *Journal of Food Science* 56(5): 1991: 1197-1202

2089

Shahidi (F) and Pegg (RB). **Novel synthesis of cooked cured-meat pigment.** *Journal of Food Science* 56(5): 1991: 1205-1208

Cooked cured-meat pigment was synthesized from bovine blood and a nitrosating agent in aqueous sol. at elevated temp. Effects of reductant(s) and base in the reaction mixture were investigated on the yield and purity of the pigment. The best yield of pigment was 95% with purity > 98% in most cases. Absorption characteristics of the pigment were identical to those of pigments extracted from a nitrite-cured ham or from hemin-nitric oxide synthesis. Colour imparted to comminuted pork by the pre-formed pigment, upon cooking, and its colour stability thereafter, were indistinguishable from that of nitrite-cured meat, yet depended on the myoglobin content. AS

2090

Shahidi (F), Pegg (RB) and Shamsuzzaman (K). **Colour and oxidative stability of nitrite-free cured meat after γ-irradiation.** *Journal of Food Science* 56(5): 1991: 1450-1452

The effects of 5 and 10 kGy irradiation on the colour and oxidative stability of meats treated with nitrite or a nitrite-free curing system were investigated. Irradiation had no detrimental effects on the colour or flavour of either cured samples. Polyphosphates had a beneficial effect on oxidative stability but had a slight detrimental effect on colour stability of irradiated samples. BV

2091

Palombo (R), Van Roon (PS), Prins (A) and Krol (B). **Comparative study on three methods for determining air content in meat batters.** *Journal of Food Science* 56(5): 1991: 1453-1454

Measurement of air content in meat batters is useful, as larger amounts of air negatively affect some properties of comminuted products. Three methods were compared. One method (Vemag) involved liberation of entrapped air from the batter by the combined effects of vacuum and mechanical

forces. The other two methods involved application of under- (Smrat) or over- (Handtmann) pressure and calculation of the air content using Boyle's ideal gas law. The Smrat showed the lowest reproducibility. However, being the most rapid and easy to use, it was the method of choice for routine quality and process control. The Vemag and more favourably the Handtmann were recommended for accurate and reproducible detn. AS

Beef

2092

Kim Ha (J) and Lindsay (RC). **Volatile fatty acids in flavours of potatoes deep-fried in a beef blend.** *Journal of the American Oil Chemist's Society* 68(5): 1991: 294-298

The volatile free fatty acids were analyzed in commercial french-fried potatoes that had been deep-fried in beef tallow-hydrogenated vegetable oil shortening. The results showed that many of the volatile fatty acids present in beef tallow were transferred to the potatoes. Of the fatty acids derived from beef tallow, butanoic, 2-methylbutanoic, 3-methylbutanoic, heptanoic, 4-methyltanoic, and nonanoic acids were present in concn. above their respective thresholds, and should contribute to tallow-like flavours. Several unsaturated volatile fatty acids also were identified, and they should contribute to the general deep-fried potato flavour. AS

2093

Mitchell (GE), Giles (JE), Rogers (SA), Tan (LT), Naidoo (RJ), Ferguson (DM). **Tenderizing, ageing and thawing effects on sensory, chemical, and physical properties of beef steaks.** *Journal of Food Science* 56(5): 1991: 1125-1129

2094

Shackelford (SD), Koohmaraie (M), Whipple (G), Wheeler (TL), Miller (MF), Crouse (JD), Reagan (JO). **Predictors of beef tenderness: Development and verification.** *Journal of Food Science* 56(5): 1991: 1130-1135, 1140

2095

Payne (CA), Moody (WG), Langlois (BE), Means (WJ) and Aaron (DK). **Microbial characteristics of three formulations of precooked, vacuum-packaged restructured beef steaks.** *Journal of Food Science* 56(5): 1991: 1136-1140

2096

Papadopoulos (LS), Miller (RK), Acuff (GR), Lucia (LM), Vanderzant (C), Cross (HR). **Consumer and trained sensory comparisons of cooked beef top rounds treated with sodium lactate.** *Journal of Food Science* 56(5): 1991: 1141-1146, 1153

2097

Stutz (HK), Silverman (GJ), Angelini (P) and Levin (RE). **Bacteria and volatile compounds associated with ground beef spoilage.** *Journal of Food Science* 56(5): 1991: 1147-1153

2098

Minerich (PL), Addis (PB), Epley (RJ) and Bingham (C). **Properties of wild rice/ground beef mixtures.** *Journal of Food Science* 56(5): 1991: 1154-1157

2099

Miller (AJ) and Menichillo (DA). **Blood fraction effects on the antibotulinal efficacy of nitrite in model beef sausages.** *Journal of Food Science* 56(5): 1991: 1158-1160, 1181

2100

Mohan Reddy (I) and Carpenter (CE). **Determination of metmyoglobin reductase activity in bovine skeletal muscles.** *Journal of Food Science* 56(5): 1991: 1161-1164

2101

Nuckles (RO), Smith (DM) and Merkel (RA). **Properties of heat-induced gels from beef skeletal, heart, lung and spleen protein fractions.** *Journal of Food Science* 56(5): 1991: 1165-1170

2102

Wild (JL), Sebranek (JG) and Olson (DG). **Grinding time and pressure developed in beef and pork: Effects of temperature and fat.** *Journal of Food Science* 56(5): 1991: 1171-1175

2103

Horgan (DJ), Kurth (LB) and Kuypers (R). **pH effect on thermal transition temperature of collagen.** *Journal of Food Science* 56(5): 1991: 1203-1204, 1208

Differential scanning calorimetry (DSC) was used to measure the thermal transition temp. of bovine intramuscular and tendon collagen. Equilibration of the collagen in buffers in the pH range 4.25-7.40 resulted in a decline in transition temp. with decreasing pH. This was more pronounced in collagen with higher concn. of aldimine crosslinks. It was proposed that the postmortem pH decline was responsible for the thermal transition temp. decline observed by other workers. Therefore, thermal transition temp. measurements must be performed on collagen samples that have been throughly

equilibrated to a common pH if they are to be used as indices of structural changes. AS

Pork

2104
Brewer (MS), Mckeith (F), Martin (SE), Dallmier (AW) and Meyer (J). **Sodium lactate effects on shelf-life, sensory and physical characteristics of fresh pork sausage.** *Journal of Food Science* 56(5): 1991: 1176-1178

2105
Decker (EA) and Crum (AD). **Inhibition of oxidative rancidity in salted ground pork by carnosine.** *Journal of Food Science* 56(5): 1991: 1179-1181

2106
Andersen (HJ) and Skibsted (LH). **Oxidative ctability of frozen pork patties. Effects of light and added salt.** *Journal of Food Science* 56(5): 1991: 1182-1184

2107
Defreitas (Z) and Molins (RA). **Mechanically deboned pork use in fermented meat spreads.** *Journal of Food Science* 56(5): 1991: 1185-1190

Poultry

Chickens

2108
Zubillaga (MP) and Maerker (G). **Quantification of three cholesterol oxidation products in raw meat and chicken.** *Journal of Food Science* 56(5): 1991: 1194-1196, 1202

The results indicates that cholesterol oxidation products in meat and chicken could be measured at levels below 1 p.p.m. and 7-ketocholesterol and the isomeric 5,6-epoxides occur in such tissues with the amounts of the ketone exceeding those of the epoxides. SRA

Products

Eggs

2109
Satyanarayana Rao (TS). **Changes in solubility, β-carotene and development of non-enzymatic browning of spray-dried, foam-mat-dried and freeze-dried whole egg powders packed in different packaging materials.** *Journal of Food Science and Technology (India)* 29(4): 1992: 231-234

Drying conditions and packaging materials did not significantly influence solubility, destruction of β-carotene and development of non-enzymatic browning of spray-dried, foam-mat-dried and freeze-dried egg powders during storage at 4, 19 - 27 and 37 C upto 365 days. However, the storage at 42 and 55 C had significant effect on these attributes in all the 3 types of egg powders packed in cans and flexible pouches. AS

2110
Juhi Raikhy and Bawa (AS). **Studies on pickled chicken eggs.** *Journal of Food Science and Technology (India)* 29(4): 1992: 246-248

Sensory evaluation of egg pickles prepared with citric, acetic; lactic and tartaric acids indicated overall acceptability of the product made with lactic and tartaric acids when used alongwith 10% common salt, spices, condiments and oil. The storage period did not affect the sensory parameters. AS

2111
Wang (C) and Shelef (LA). **Factors contributing to antilisterial effects of raw egg albumen.** *Journal of Food Science* 56(5): 1991: 1251-1254

Sensitivity of *Listeria monocytogenes* strain Scott A and Brie-1 to several factors in raw egg albumen was investigated. A concn. of ca 15% of albumen in trypticase soy broth was listeristatic after 24 h at 35 C, and listericidal effects were observed at higher concn. Supplementation of albumen with Fe and biotin did not reverse the inhibition. Preheating of albumen (50 - 80 C) caused progressive loss of antilisterial effects. Supplementation of broth with lysozyme (> 1 mg/mL) produced antilisterial effects that were enhanced at pH 9; conalbumin (> 6 mg/mL) suppressed cell growth, while ovomucoid (> 2 mg/mL) was inhibitory only at pH 9. Results inferred that antilisterial effects of albumen were caused primarily by lysozyme and were enhanced by ovomucoid, conalbumin and alkaline pH. AS

2112
Chung (SL) and Ferrier (LK). **Partial lipid extraction of egg yolk powder: Effects on emulsifying properties and soluble protein fraction.** *Journal of Food Science* 56(5): 1991: 1255-1258

Solvent extraction to remove lipid from egg yolk decreased emulsifying properties of the resulting protein concentrates. Hexane and isopropanol had the least effects. Hexane-isopropanol extraction (77:23, w:w) reduced emulsifying activity (per 25 mg

protein) about 14% and protein solubility decreased from 15.7 to 13.8% but removed more than 50% of the lipid from egg yolk powder. Chloroform-methanol decreased total emulsifying activity upto 41%. Ovalbumin in the water-soluble fraction of extracted egg yolk powder reduced its emulsifying effectiveness. SRA

2113

Chung (SL) and Ferrier (LK). **Conditions affecting emulsifying properties of egg yolk phosvitin.** *Journal of Food Science* 56(5): 1991: 1259-1262

The effects of protein concn. (0.1 - 2.0%), oil vol. fraction (0.17 - 0.67), mixing speed (10,000 - 22,000 r.p.m.) and mixing time (0.5 - 8 min) on the emulsifying properties of phosvitin and bovine serum albumin (BSA) were compared. Emulsifying activity and emulsion stability increased with protein concn., oil vol. fraction and mixing. Effects of these variables were assessed quantitatively using an empirical equation. Mixing speed had the greatest influence and protein concn. had the least influence on emulsifying activity for both phosvitin and BSA. For emulsion stability, mixing speed had the greatest influence for phosvitin; oil vol. fraction had the greatest influence for BSA. Phosvitin was a better emulsifier than BSA at pH 7. AS

2114

Singh (RP) and Panda (B). **Storage stability of oil-based pickled quail eggs.** *Indian Journal of Poultry Science* 26(4): 1991: 221-225

Storage stability of quail eggs pickled in oil-based gravy containing 3% common salt and 2% acetic acid and stored in rigid (glass and plastic) jars or in flexible (PFP laminate, HDPE and PP) pouches for 9 and 15 months at mean ambient (28 C; 61% RH) and refrigerated (4 - 6 C; 80 - 85% RH) temp., were investigated. The rates of diffusion of both acid and salt were faster in egg white than in yolk and under ambient than refrigerated storage. Pickling caused approx. 2-fold increase in shear values of egg white. A progressive increase in % free fatty acids and a decrease in sensory quality occurred with storage time. Halophilic counts remained fairly low. Coliforms, anaerobes, *Salmonella* and coagulase-positive staphylococci were not detected in pickles throughout storage. The product could be safely stored in HDPE (330 G) pouches for 8 and 15 months under ambient and refrigerated conditions, respectively, instead of conventional rigid containers or intermediate cost PFP laminate. AS

2115

Maiti (D) and Biswas (S). **Effect of feeding deoiled niger (*Guizotia abyssinica*) cake on egg production and egg quality.** *Indian Journal of Poultry Science* 26(4): 1991: 229-232

Deoiled niger cake (DNC) was included in the test diet of egg replacing groundnut cake (DGNC) protein at 0, 25, 50, 75 and 100% levels on equal nitrogenous and isocaloric basis. The birds were fed from 127 days of age. For egg quality studies, fresh eggs (8 eggs from each group) were collected at random at 278, 279 and 280 days of age. Egg wt., shape index, thin white %, albumin index, yolk index, shell thickness and Haugh unit score were recorded. When DNC was substituted up to 75% protein level, no adverse effect on egg production, egg wt., feed consumption per dozen of eggs and feed consumption per kg egg wt. was observed. Egg quality was also not affected by the substitution up to 100% DNC level except lowering of the egg wt. GS

2116

Singh (SV) and Panda (PC). **Peeling property of boiled eggs. A review.** *Poultry Guide* 29(6): 1992: 69-71, 73-79

Peeling property of boiled eggs is related to coagulation of egg white. The factors influencing coagulation of egg white are temp., dilution, salt, sugar, acid and alkali. The role of these are described. Storage, pH, shell treatment, oil coating, and the sp. of origin of egg are also factors influencing the peeling property of eggs. Cooking techniques which influence the peeling property are illustrated. The review concluded with the quality of cooked eggs including flavour, appearance and acceptability of peeled eggs. GS

SEAFOODS

2117

Paturkar (AM), Sherikar (AA), Jayarao (BM) and. **Prevalence of *Salmonella* in meats and seafoods of Bombay city.** *Journal of Food Science and Technology (India)* 29(4): 1992: 242-243

Fifteen of the 166(9%) meat samples tested were positive for *Salmonella* in contrast to its absence in 96 fish samples, collected in Bombay. The serotype *S. saintpaul* predominated in the slaughterhouse meat as against the dominance of *S. mbandaka*, *S. adelaide*, *S. liverpool*, *S. anatum*, *S. derby* and *S. butantan* in market meat samples. *S. mbandaka* was frequently isolated from the retail market beef samples. AS

2118

Chung (KH) and Lee (CM). **Water binding and ingredient dispersion pattern effects on surimi**

gel texture. *Journal of Food Science* 56(5): 1991: 1263-1266

Water binding, thermotransitional properties and the dispersion pattern of ingredients were studied in relation to their texture-modifying effects in surimi gels. The DSC-measured bound water (unfreezable at -30 C) of surimi gels prepared with potato starch with and without pregelatinization highly correlated with compressive force (r = 0.94) and inversely correlated with expressible moisture (R = 0.99) of the gels. For nonfish proteins, however, physically bound water contributed more than the DSC-measured bound water to gel strength. The ability to undergo thermal transition (size expansion and water absorption) and dispersion pattern of ingredients were responsible for the differences in texture-modifying effects. AS

Oysters

2119
Chai (T), Liang (KT), Pace (J) and Schlimme (DV). **Effect of heat processing on quality of pasteurized oysters.** *Journal of Food Science* 56(5): 1991: 1292-1294

Constant heating time at different temp. and constant temp. with different heating times combinations were studied to determine optimum heat process for oyster pasteurization in plastic pouches. Heating for 8 min at 75 - 76 C gave optimum physical and sensory quality to the product. Crude amylase and peroxidase extracts from oysters were inactivated by optimum treatment, but lipase retained about 15% of activity. AS

Seal

2120
Synowiecki (J) and Shahidi (F). **Lipid and pigment extraction from mechanically separated seal meat.** *Journal of Food Science* 56(5): 1991: 1295-1297

Mechanically separated seal meat (MSSM) was washed 3x with water. Total hemoprotein pigment content of MSSM was reduced by 49.5% after the first washing, 65.1% after the second, and 67.5% after the third. Hunter L value (lightness) was increased from 14.8 to 32.4 after three washings. Hunter L values correlated (r = -0.990) well with total hemoprotein content of the meat. The total lipid content of the meat was also reduced by 30.7 to 57.5%, depending on the original fat content of the sample after washings. The yield of meat protein after the second washing was increased from 32% to 70.5% when a centrifugation instead of filtration method was employed. AS

Squids

2121
Selvaraj (P), Indra Jasmine (G) and Jeyachandran (P). **Effect of polyphosphate dip treatment on frozen storage of Indian squid *Loligo duvaucelI* Orbigny.** *Journal of Food Science and Technology (India)* 29(4): 1992: 248-249

Squid fillets (Mantles) given a dip treatment in aqueous trisodium polyphosphate sol. (5% w/v) prior to freezing showed reduced protein denaturation as evidenced by improved texture, decreased thaw and wt. loss, retention of salt soluble and α-amino nitrogens as compared with control squids during frozen storage. The overall acceptance is better in polyphosphate treated samples than in control. AS

Fish

2122
Voldrich (M), Dobias (J), Kalac (PJr) and Curda (D). **Changes of fatty acid composition during the processing of fish.** *Die Nahrung* 35(6): 1991: 663-664

Marked changes of the fatty acid comp. were observed in the smoked and marinated (processed) samples of mackerel meat. The processed fillets contained about 70% of n-3 polyunsaturated fatty acids (PUFAs). In case of smoked fish n-3 PUFAs loss was higher probably due to hydrolysis of fat before processing. In spite of the losses observed in the fish products-both marinated and smoked are an important source of n-3 PUFAs in human nutrition. BV

2123
Boyle (JL), Lindsay (RC) and Stuiber (DA). **Adenine nucleotide degradation in modified atmosphere chill-stored fresh fish.** *Journal of Food Science* 56(5): 1991: 1267-1270

Effects of CO_2 modified atm. on degradation of adenine nucleotides in chill-stored whitefish (*Coregonus clupeaformis*) and rainbow trout (*Salmo gairdneri*) were studied. K values were determined during storage up to 26 days. Results indicated CO_2 atm. did not alter K values compared to those observed for aerobically held fish. However, both CO_2 atm. and potassium sorbate-dipping of fillets caused decreases in hypoxanthine concn. compared to untreated aerobically held samples. AS

2124
Ohashi (E), Takao (Y), Fujita (T), Shimizu (Y) and Egashira (M). **Semiconductive trimethylamine gas sensor for detecting fish freshness.** *Journal of Food Science* 56(5): 1991: 1275-1279, 1286

Characteristics were studied on In_2O_3 treated with 5 mol% MgO responses to 300 p.p.m. trimethylamine (TMA), dimethylamine (DMA), ammonia and other gases evolved from several different fish muscles stored under different conditions. Sensitivities of the In_2O_3-MgO sensor element were higher in order of TMA, DMA and ammonia over the operating range 330-620 C. Sensor responses were directly proportional to concn. of TMA in fish muscle in the presence of other evolved gases, irrespective of types of fish muscle or storage time. AS

Finfish

2125
Himelbloom (BH), Brown (EK) and Lee (JS). **Microorganisms on commercially processed Alaskan finfish.** *Journal of Food Science* 56(5): 1991: 1279-1281

Whole and processed Alaskan fish were examined for aerobic plate counts, total coliforms, and *Escherichia coli*. Washing whole salmon and halibut reduced skin microbial counts from $10^3/cm^2$ to $10^2/cm^2$. Whole and dressed fish had coliform counts < $13/cm^2$ and *E. coli* counts < $0.3/cm^2$. Alaska pollock and Pacific cod fillets had microbial counts between 10^3/g and 10^6/g, coliform counts < 70/g, and *E. coli* counts < 4/g. Whole fish contained microbial flora predominated by *Moraxella* sp. whereas dressed fish and fillets had microbial flora consisting of *Arthrobacter/Corynebacterium*, *Flavobacterium*, and *Pseudomonas* sp. Microorganisms on conveyor belts and other contact surfaces may have contributed contaminants to fillets. AS

Salmon

2126
Girard (B) and Nakai (S). **Static headspace gas chromatographic method for volatiles in canned salmon.** *Journal of Food Science* 56(5): 1991: 1271-1274

Amount of fish placed in vials as well as incubation temp. and time were factors studied to improve a static headspace sampling method applied to analyze volatiles in canned salmon. A random-centroid optimization (RCO) program was used to simultaneously search for the optimal levels of other factors, namely, initial oven temp., column headpressure, and total flowrate. RCO was an effective optimization program while allowing testing of several treatments at a time. The optimal conditions of operation permitted detection of 80 volatile compounds, 34 of which were identified including aldehydes, alkanes, aromatic compounds, sulphur-containing compounds, alkenes, ketones, several miscellaneous compounds plus an alcohol and an acid. AS

2127
Durance (TD) and Collins (LS). **Quality enhancement of sexually mature chum salmon *Oncorhynchus keta* in retort pouches.** *Journal of Food Science* 56(5): 1991: 1282-1286

Sexually mature or late-run chum salmon muscle was packaged in thin-profile retort pouches and in conventional 307 x 200 metal cans. After retort processing to equivalent lethality, samples were evaluated by sensory and instrumental methods. The pouch product was firmer, more fibrous, drier and chewier than the canned. Less late-run flavour and greater overall acceptability were reported for pouch-processed samples. More free liquid was found in pouches than in cans. Histological examination revealed a more compact structure in chum muscle processed in retort pouches, possibly due to air over-pressure applied to flexible pouches during processing. AS

Products

Fish

2128
Konstance (RP). **Axial compression properties of kamaboko.** *Journal of Food Science* 56(5): 1991: 1287-1291

Kamaboko, a gelled seafood product from frozen surimi, has distinctive textural properties. Characterization of those properties, using an integrated approach to rheological studies, was accomplished by means of an instrumental texture profile analysis and evaluation of resultant stress-strain relationships. The material had near-ideal area expansion even at compressions of 60% while retaining its highly elastic texture. Apparently the product did not yield through 80% compression. Hardness of the kamaboko at 80% compression was characterized by a local max. at 37.5 C which may have been related to processing temp. of the initial surimi gel-set used in a double-gel-set procedure. Evaluation of stress-strain relationships confirmed the incompressible nature of the gel and showed relatively slight variations between the Young's

modulus and the deformability modulus. The elastic limit of the kamaboko increased significantly as temp. increased from 25 to 50 C. AS

Fish oil

2129

Hsieh (Y-TL) and Regenstein (JM). **Factors affecting quality of fish oil mayonnaise.** *Journal of Food Science* 56(5): 1991: 1298-1301, 1307

Packaging conditions, antioxidants, metals and storage temp. affected the quality of fish oil (FO) mayonnaise (FOM). TBHQ was a successful antioxidant but ascorbate was not. N_2 retarded oxidation more than TBHQ. The metal content of FO was as low as soy oil (SO), suggesting that differences in quality deterioration were not due to metal content. FOM was more stable at refrigerator temp. (2 C) than at higher temp. (30 C). The sensory quality of deodorized FOM was equal to SO mayonnaise using TBHQ (0.02%), N_2, and storing at 2 C for 14 wk. AS

PROTEIN FOODS

2130

Ngo Som (J), Prajwala Mouliswar, Daniel (VA), Malleshi (NG) and Venkat Rao (S). **Digestibility of protein and starch in malted weaning foods.** *Journal of Food Science and Technology (India)* 29(4): 1992: 262-263

Roller-drying reduced *in vitro* protein digestibility of weaning foods based on malted/roasted maize/rice and malted cowpea. Cooking of weaning foods improved protein digestibility as compared to uncooked blends. *In vitro* starch digestibility was similar in various blends of cooked weaning foods. Increasing the malted material in weaning foods improved the digestibility of protein, but not the digestibility of starch. AS

ALCOHOLIC AND NON-ALCOHOLIC BEVERAGES

Non-alcoholic beverages

Coffee

2131

Kesavan (PC). **Protection by caffeine against oxic radiation damage and chemical carcinogens: Mechanistic considerations.** *Current Science* 62(12): 1992: 791-797

Caffeine administered after exposure to UV light enhances the damage to cells and organisms by inhibiting photoreactivation, excision and/or recombinational repair. But, if caffeine is already present in the system, it affords remarkable protection not only against O_2-dependent component of radiation damage, but also against chemical carcinogens that require metabolic activation. The possible mechanistic aspects are discussed in this review. KAR

Fruit juices

2132

Ganesh Kumar (C), Kanawjia (SK), Ladkani (BG) and Singh (S). **Recent advances in the processing of fruit juices.** *Indian Dairyman* 44(4): 1992: 167-179

Biotechnological techniques are increasingly used to get fruit juices which resemble the fresh juice in flavour, aroma, appearance and mouthfeel. Cost efficiency in processing methods; use of enzymes like pectinase, cellulase and hemicellulase in juice processing; nutritional evaluation of processed product; and development of new blended and nutrient fortified beverages with therapeutic value are the aspects considered. 61 references. GS

Apple juices

Apple juice concentrates

2133

Dar (H), Zargar (MY) and Shah (GH). **Effect of processing operations and heat treatment on physico-chemical characteristics and microbiological load of apple juice concentrate.** *Indian Food Packer* 46(1): 1992: 45-50

Apple juice at various stages of processing did not show change in the pH, but acidity increased while concentrating to 71°Brix. Heat treatment of juice at 70 C for 1 h slightly increased total soluble solids due to the evaporation during this process. With the successive operations in concn. clarity increased after enzyme and gelation treatment. The raw juice was dominated by molds followed by yeasts whereas after processing, the yeasts dominated than molds and bacteria. Filteration decreased mold population. Heat treatment at 70 C for 1 h caused a net reduction to 0.68 - 4.6% in bacterial population, 1.03 - 3.23% in yeasts count and 1.19 - 2.44% in mold population, and an overall reduction of 96.9 - 98.8% in total microbial load. In the concn. the bacteria, yeasts and molds were within the range of 0.1/g. Osmophiles were < 100/g in unheated juice and were 1/g in conc. juice. GS

2134
Joshi (VK), Sandhu (DK), Attri (BL) and Walia (RK). **Cider preparation from apple juice concentrate and its consumer acceptability.** *Indian Journal of Horticulture* 48(4): 1991: 321-327

Fortification of apple juice concentrate with diammonium hydrogen phosphate as nitrogen source is essential for rapid fermentation. Must prepared by diluting the concentrate fermented faster than that diluted and ameliorated with sugar. The product prepared from direct dilution of the concentrate was found superior in sensory quality. SRA

Grape juices

2135
Masoodi (FA), Kaur (B) and Kaur (H). **Effect of harvesting dates on the physico-chemical composition and quality of grape juice cv., Perlette.** *Indian Journal of Horticulture* 48(4): 1991: 328-333

Perlette var. grapes cultivated widely in Punjab matures only when the rainy season starts and the juice extracted is not of good quality. Hence, as assessment was made of the quality of juice extracted from Perlette var. grape harvested on 5 different dates starting form 1st to 18th June 1990 and also blending the juice with that extracted from Thompson-Seedless grapes in different proportions. Partial neutralization of the juice of early maturity, blending of Perlette-Thompson seedless grape juice up to 60:40 ratio, and addition of sugar up to 5% improved the early harvested Perlette grape juice quality. SRA

Orange juices

2136
Nisperos-Carriedo (MO), Shaw (PE) and Baldwin (EA). **Changes in volatile flavour components of pineapple orange juice as influenced by the application of lipid and composite films.** *Journal of Agricultural and Food Chemistry* 38(6): 1990: 1382-1387

2137
Kimball (DA) and Norman (SI). **Processing effects during commercial debittering of California navel orange juice.** *Journal of Agricultural and Food Chemistry* 38(6): 1990: 1369-1400

2138
Baker (RA), Crandall (PG), Davis (KC) and Wicker (L). **Calcium supplementation and processing variable effects on orange juice quality.** *Journal of Food Science* 56(5): 1991: 1369-1371

Untreated, pectinesterase (PE) treated, low pulp, and pectinase treated orange juices were fortified to 20% RDA of Ca with $CaCO_3$ or $CaPO_4$/lactate (75/25). Neither Ca supplement adversely affected flavour, cloud density, settling pulp, or viscosity in untreated, low pulp, or pectinase treated juices. PE exposed orange juice held 4 h before pasteurization and Ca supplementation had less cloudy density, increased viscosity and more settling pulp. $CaCO_3$ fortified PE exposed and pectinase treated juices had lower flavour scores, while $CaPO_4$ suspensions caused slightly lower colour scores of all juices. AS

Orange juice concentrates

2139
Crandall (PG) and Davis (KC). **Viscosity reduction and reformation of structure in orange concentrate as affected by homogenization within commercial taste evaporators.** *Journal of Food Science* 56(5): 1991: 1360-1364

Exp. were undertaken to determine if homogenization would reduce viscosity of bulk orange concentrate during commercial production and if a structure built-up during storage. Homogenizers, installed within two taste evaporators at separate citrus processing plants, were cycled "on" for homogenized samples and "off" for controls. In four replicates, homogenization significantly reduced viscosity to 19% average. Samples were stored for 6 months under tank farm conditions. Structure increased in 5 of 8 samples, but homogenized samples remained significantly lower in viscosity. This confirmed earlier pilot plant results under commercial operations. AS

Passion fruit juices

2140
Shoseyov (O), Bravdo (BA), Siegel (D), Goldman (A), Cohen (S), Shoseyov (L), Ikan (R). **Immobilized endo-β-glucosidase enriches flavour of wine and passion fruit juice.** *Journal of Agricultural and Food Chemistry* 38(6): 1990: 1387-1390

FATS AND OILS

Fats

2141
Sridhar (R) and Lakshminarayana (G). **Triacylglycerol compositions of some vegetable**

fats with potential for preparation of cocoa butter equivalents by high performance liquid chromatography. *Journal of the Oil Technologists Association of India* 23(3): 1991: 42-43

The triacylglycerols (TAG) composition of kokum (*Garcinia indica*), dhupa (*Vateria indica*), sal (*Shorea robusta*), mango (*Mangifera indica*), cocoa (*Theobroma cocao*) and papaya (*Carica papaya*) fats were determined by reversed phase HPLC. Kokum, dhupa, sal and mango TAG contained 85, 72, 76 and 62% of monounsaturated-disaturated glycerides. The papaya TAG contained tri-unsaturated and monounsaturated-diunsaturated glycerides as the major components. The TAG compositions of the indigenous vegetable fats could be useful in their modification into cocoa butter and in the identification of their presence when blended with cooca butter. SRA

Vanaspati

2142

Shenolikar (I). **Nickel content in vanaspati.** *Journal of the Oil Technologists Association of India* 23(3): 1991: 48-49

Ni content of vanaspati (hydrogenated fat) collected from market and household was analysed. The mean Ni content of the 25 samples was 1.55 p.p.m. with a range from 0.3 to 4.54 p.p.m. Vanaspati sold in sealed container or as loose did not show any difference in Ni content. Hence, vanaspati contributes negligible amount of Ni to the Indian diet. SRA

Oils

2143

Snyder (JM), Mounts (TL) and Holloway (RK). **An analysis scheme for estimation of crude oil quality.** *Journal of the American Oil Chemist's Society* 68(5): 1991: 285-288

A seed analysis scheme was designed to rapidly estimate the quality of extracted oil. Factors of crude oil quality evaluated were: free fatty acids, oxidative status (Totox value), colour, and phosphatides (soybean) or wax (sunflower). Soybean and sunflower seeds subjected to extended storage at varying moisture contents were sampled at incremental time periods to yield fifty storage-damaged samples of each oilseed. Oil was extracted from 50 g lots of each samples and analysed for the crude oil quality factors according to standard methods. Alternative instrumental and chemical analyses of the quality factors were correlated with the standard methods. Hexanal content, measured by headspace-gas chromatographic analysis of the ground full-fat meal, was correlated to the oxidative status. Crude oils recovered by rapid extraction, using sonication, and desolventation were monitored by spectrophotometry for colour correlation. Free fatty acid content was determined by titration methods and monitored by spectrophotometry. Modified turbidimetric methods estimated the phosphatides (soybean) or wax (sunflower seed) contents. The analysis scheme provides for the rapid estimation of oil quality as impacted by various pre- and post-harvest events that cause deterioration of oilseeds. AS

2144

Sebedio (JL), Kaitaranta (J), Grandgirard (A) and Malkki (Y). **Quality assessment of industrial prefried french fries.** *Journal of the American Oil Chemist's Society* 68(5): 1991: 299-302

An industrial production of prefried french fries using palm oil as a frying medium was studied over a period of 12 days. Samples of oil and french fries were withdrawn once a day. The quality of both the oil and the french fries was assessed using two types of tests. Some tests, such as the detn. of free fatty acid (FFA) and the detn. of thiobarbituric acid value (TBA), oxifritest and Food Oil Sensor correspond to what was used by a quality control lab. More elaborate techniques such as the detn. of polar components, polymers and cyclic fatty acid monomers (CFAM) were also used. Only small increases of FFA, TBA, polar components and polymers were observed. However, in the case of palm oil, which contains a high percentage of diglycerides, it is more reliable to determine the quality of the oil using the amount of polymers instead of polar components which may include some diglycerides. Thus a high "polar components" value (up to 20-25%) would not necessarily reflect an altered sample. The max. amount of CFAM detected was 0.1% and they did not seem to be preferentially adsorbed on the french fries. These results, along with the sensory evaluations, showed that the french fries obtained in these production conditions were of good quality as far as the fat was concerned. AS

2145

Adlof (RO), Rakoff (H) and Emken (EA). **Preparation of deuterium-labelled methyl linoleate and its geometric isomers from natural seed oils.** *Journal of the American Oil Chemist's Society* 68(5): 1991: 303-306

Multi-gram quantities of deuterium-labelled methyl linoleate (methyl *cis*-9,*cis*-12-octadecadienoate) and its geometric isomers are readily synthesized from

Crepis alpina (70-80% 12,13-epoxy-*cis*-9-octadeconic acid) seed oils. Methyl *cis*-9,*cis*-12- and *trans*-9,*cis*-12-octadecadienoate-12,13-d_2 were prepared by the Lindlar-catalyzed reduction (with D_2 gas) of methyl *cis*-9- and *trans*-9-octadecen-12-ynoates, respectively. Methyl *trans*-9-octadecen-12-ynoate was synthesized by the *p*-toluene-sulphinic acid-catalyzed isomerization of the corresponding *cis* isomer. Methyl *cis*-9,*cis*-12; *trans*-9,*cis*-12; *cis*-9,*trans*-12- and *trans*-9, *trans*-12-octadecadienoate-d_2,- d_4- and d_6 were prepared by the Wittig coupling (with stereochemical control) of the appropriate d_2-, d_4- or d_6-alkyltriphenyl-phosphonium salt with methyl 12-oxo-*cis*-9- or *trans*-9-dodecenoate (prepared by the para-periodic acid cleavage of methyl 12,13-dihydroxy-*cis*-9- or *trans*-9-octadecenoate). The *cis* dihydroxy ester was synthesized from *Vernonia galamensis* seed oil by acetolysis, saponification and then esterification. The *cis* dihydroxy ester was isomerized by nitric acid/sodium nitrite to the *trans* form and purified by silver resin chromatography. Isotopic purities ranged from 88% (for the d_6 isomers) to 99% (for the d_2 isomers). AS

Cottonseed oils

2146

Kapseu (C), Kayem (GJ), Balesdent (D) and Schuffenecker (L). **The viscosity of cottonseed oil, fractionation solvents and their solutions.** *Journal of the American Oil Chemist's Society* 68(2): 1991: 128-130

Cold fractionation of cottonseed oil is made difficult by the high viscosity of the oil. This study was aimed at demonstrating the effect of solvents on the viscosity of mixtures between 0 and 25 C with a view to facilitating the fractionation of refined cottonseed oil. The solvents used were acetone, methylethylketone, methylisobutylketone, hexane and heptane. Measurements of viscosity were carried out by means of a capillary viscometer. The ratio of the viscosity of cottonseed oil to that of pure solvents is of the order of 300. The viscosities of solutions of various ratios of solvent to oil (1/3, 1/1, 3/1) are between those of cottonseed oil and the pure solvents. The effect of the solvent/oil ratio overrides that of solvent nature. The effect of solvent in reducing the viscosity of cottonseed oil is by descending order: acetone, hexane, methylethylketone, heptane, methylisobutylketone. AS

Rice bran oils

2147

Adhikari (J) and Adhikari (S). **Semi-quantitative detection of rape-mustard oil in rice bran oil.** *Journal of the Oil Technologists Association of India* 23(3): 1991: 50-52

The % of erucic, eicosenoic and linolenic acids can detect semi-quantitatively the proportion of Indian rape-mustard oil when present in rice bran oil. Fatty acid analysis of 22 Indian rape/mustard oil drawn from different seed var. and market samples were carried out. At 10% level of admixture or adulteration, the % would be 5.0 for erucic acid (22:1), 0.7 for eicoenoic acid (20:1) and 1.7 for linolenic acid (18:3). At 20% level, these % would be 10.0, 1.4 and 2.7 respectively. SRA

Soybean oils

2148

Palaniappan (S) and Proctor (A). **Evaluation of soy oil lutein isotherms obtained with selected adsorbents in hexane miscellas.** *Journal of the American Oil Chemist's Society* 68(2): 1991: 79-82

Bleaching of soy oil hexane/miscellas by adsorption of the lutein was examined. Quantitative differences in the adsorption behaviour between a bleaching clay, alkaline rice hull ash and acid rice hull ash were measured by comparing the constants, K and n, of Freundlich isotherms. All the isotherms were dose-dependent with K being inversely related and n directly related, to adsorbent mass. Overall, the bleaching clay performed better than the ashes. Alkaline ash had a larger K value than acid ash, but the n value of acid ash was greater. Equations of lutein adsorption were derived based on initial concn. on lutein and the amount adsorbed/g. Logarithmic plots produced constants, K^1 and n^1, which were the intercept and slope, respectively. As adsorbent dose increased, K^1 decreased and n^1 increased for each adsorbent studied. These findings may have applications in the processing of dilute miscellas where low temp., low viscosity oil refining is desired. AS

2149

Schnepf (M), Spencer (G) and Carlat (J). **Chemical and sensory characteristics of stored menhaden oil/soybean oil blends.** *Journal of the American Oil Chemist's Society* 68(5): 1991: 281-284

The purpose of this study was to determine the feasibility of increasing the consumption of dietary ω-3 fatty acids by incorporating menhaden oil into a French-type salad dressing. Menhaden/soybean oil blends of 10, 20 and 30% menhaden oil (w/w) were used to prepare an emulsified French salad dressing. The oil blends and salad dressings were stored at 22 C in the dark for 20 wk. The fatty acid

profile, peroxide value, and anisidine value were determined. The salad dressings also were evaluated by a sensory panel for flavour, aroma and aftertaste. The ω-3 fatty acids were stable over time under these storage conditions. Peroxide values rose slowly and consistently over time reaching higher values when more menhaden oil was added. Peroxide values were also higher in the oil blends which were stored with air in the headspace and not flushed with argon. Anisidine values also were higher with each addition of menhaden oil but did not change over time except for the 100% menhaden oil which was stored in air. After 8 wks the sensory panel rated the salad dressing which contained menhaden oil as lower than the ones which did not contain menhaden oil. While a significant amount of ω-3 fatty acids may be incorporated into foods by the addition of menhaden oil, the development over time of off-flavours must be controlled. AS

2150

Covey (JE) and Wan (PJ). **Hydrogenation of oxidized soybean oil.** *Journal of the American Oil Chemist's Society* 68(5): 1991: 337-338

Portions of refined and bleached soybean oil were stored at various temp. for various lengths of time, then hydrogenated to 70 iodine value (IV) to find the effect of peroxides on the rate of hydrogenation and on characteristics of hydrogenated product. Samples were treated up to 3 wk at up to 65 C and provided samples with peroxide values (PV) of up to 358. All samples were analyzed, hydrogenated and reanalyzed. Peroxides affected the fatty acid composition as determined by gas chromatography, the calculated iodine value based on fatty acid composition, and rate of hydrogenation. Peroxides also affected the selectivity of hydrogenation and slope of the solids curve in hydrogenated products. AS

Sunflower oils

2151

Semwal (AD) and Arya (SS). **Storage stability of refined sunflower oil in tins and HDPE bottles.** *Journal of Food Science and Technology (India)* 29(4): 1992: 250-252

Refined sunflower oil remains stable for 2 yr at room temp. when stored in high density polyethylene (HDPE) bottles and sealed tins without development of perceptible off-flavour or odours. Peroxide, TBA, total carbonyls and anisidine values increased during storage and the changes correlated linearly with the storage period. Increases in these values were more in leaking containers. AS

2152

Carbonell (ES). **Extraction of flavours with supercritical carbon dioxide.** *Cereal Foods World* 36(11): 1991: 935-937

Flavour extraction with supercritical CO_2 results in excellent flavour characteristics with other products such as spices because of the low temp. and inert atm. involved and the potential selection of specific aroma fractions, extractions of spices and hops, ranges of solubility for CO_2, method of extraction, plant operations, examples of extraction of spices and flavours (ginger, pepper and vanilla) and dealcoholization of beverages are the aspects covered. BV

2153

Amita Srivastava and Jain (PC). **Seed mycoflora of some spices.** *Journal of Food Science and Technology (India)* 29(4): 1992: 228-230

Survey of fungal contaminants of bishopweed, black pepper, coriander and cumin from Sagar district of Madhya Pradesh, India showed occurrence of *Aspergillus flavus*, *A. niger*, *A. ochraceus*, *Penicillium*, spp., *Rhizopus arrhizus*, *R. stolonifer* and *Syncephalastrum racemosum*. However, their frequency varied widely. Samples of test spices yielded slightly lower fungal species with the use of spice extract agar medium as compared to malt-salt agar. AS

Pepper

2154

Gopalakrishnan (N) and Thomas (PP). **Studies on colour retention in pepper subjected to different treatments.** *Journal of Food Science and Technology (India)* 29(4): 1992: 256-257

Fresh pepper (*Piper nigrum* L.) was subjected to treatments such as microwave exposure, microwave exposed boiling water blanching and direct boiling water blanching to study the extent of green colour retention. The variation in the chlorophyll content at different stages was insignificant among the samples subjected to the same treatment. The best colour retention was observed in the microwave exposed boiling water blanched samples. AS

SENSORY EVALUATION

2155
Kuchiba-Manabe (M), Matoba (T) and Hasegawa (K). **Sensory changes in umami taste of inosine 5'-monophosphate solution after heating.** *Journal of Food Science* 56(5): 1991: 1429-1432

Discrimination in umami taste of inosine 5'-monophosphate (IMP) sol. caused by thermal degradation was investigated by sensory evaluation. The difference threshold of umami taste of 0.005% IMP sol. in the presence of 0.05% monosodium glutamate was 0.002%. The difference threshold of a 0.005% IMP sol. decreased by about one half when heated at 95 C for 15 h. Inosine, one of the main products of the thermal degradation of IMP, had a bitter taste. The detection threshold of inosine varied widely among panelists. Heating a 0.005% IMP solution at 95 C for 15 h formed inosine at about one tenth of its lowest detection threshold. AS

2156
Nunes (RV), Rhim (JW) and Swartzel (KR). **Kinetic parameter evaluation with: linearly increasing temperature profiles: Integral methods.** *Journal of Food Science* 56(5): 1991; 1433-1437

Two integral methods for kinetic parameter estimation with linear temp. profiles were tested using simulated and experimental data sets. They were the second rational approximation method (SRAM) and the equivalent point method (EPM) using least squares nonlinear regression (LSNR) and weighed least squares nonlinear regression (WLSNR). For three simulated data sets, the SRAM with WLSNR yielded accurate parameter estimation. For the experimental data set, both SRAM and EPM using WLSNR yielded accurate parameter estimation. The standard error in activation energy were 37.3% (for SRAM) and 46.7% (for EPM) lower than that of the differential method. The SRAM and WLSNR was the best parameter estimation procedure. AS

FOOD STORAGE

Nil

INFESTATION CONTROL AND PESTICIDES

Nil

BIOCHEMISTRY AND NUTRITION

Nil

TOXICOLOGY

2157
Lewerenz (H-J), Mieth (G), Bleyl (DWR), Plass (R) and Elsner (A). **Toxicological evaluation of sucrose carbonic acid esters in subchronic feeling studies in rats. Part 2. Effect of sucroacetoglycerides.** *Die Nahrung* 35(6): 1991; 655-662 (De)

Groups of male and female rats received a sucroacetoglycerides containing product (SAG) for 3 months at dietary levels of 0, 2.5, 5 and 10%. Food consumption was initially increased in females at all SAG-levels. After two wks significant increases in food intake were observed in males and females fed 10% SAG throughout the feeding period. The serum analysis revealed significantly elevated activity in serum alkaline phosphatase at the highest SAG-level in males and females after 6 wks and in females after 13 wks. Histological changes related to the SAG-feeding were noted in the intestinal lymph nodes of male and female animals fed 10% SAG. The no-adverse effect level established in this subchronic feeding study was 5% SAG in the diet of rats, equivalent to a daily intake of 3.6 g/kg body wt. in males and 4.0 g/kg in females. AS

2158
Choudhary (DN), Sahay (GR) and Singh (JN). **Effect of some mycotoxins on reproduction in pregant albino rats.** *Journal of Food Science and Technology (India)* 29(4): 1992; 264-265

Effect of oral administration of aflatoxin B_1, patulin and kojic acid on reproductive performance of pregnant rats showed significant anti-implantational activity. Patulin and kojic acid exhibited significant abortifacient activity. A significant loss of viability among the litters was also noticed in mycotoxin fed rats except for those fed with patulin. AS

FOOD LAWS AND REGULATIONS

Nil

AUTHOR INDEX

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Printed and published by Director, Central Food Technological Research Institute, Mysore 570 013, at CFTRI Printing Press. Editor: Shri K. A. Ranganath, CFTRI, Mysore.